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AVIATION

The Oldest American Aeronautical Magazine

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MAKING *Aerial Mapping* PAY

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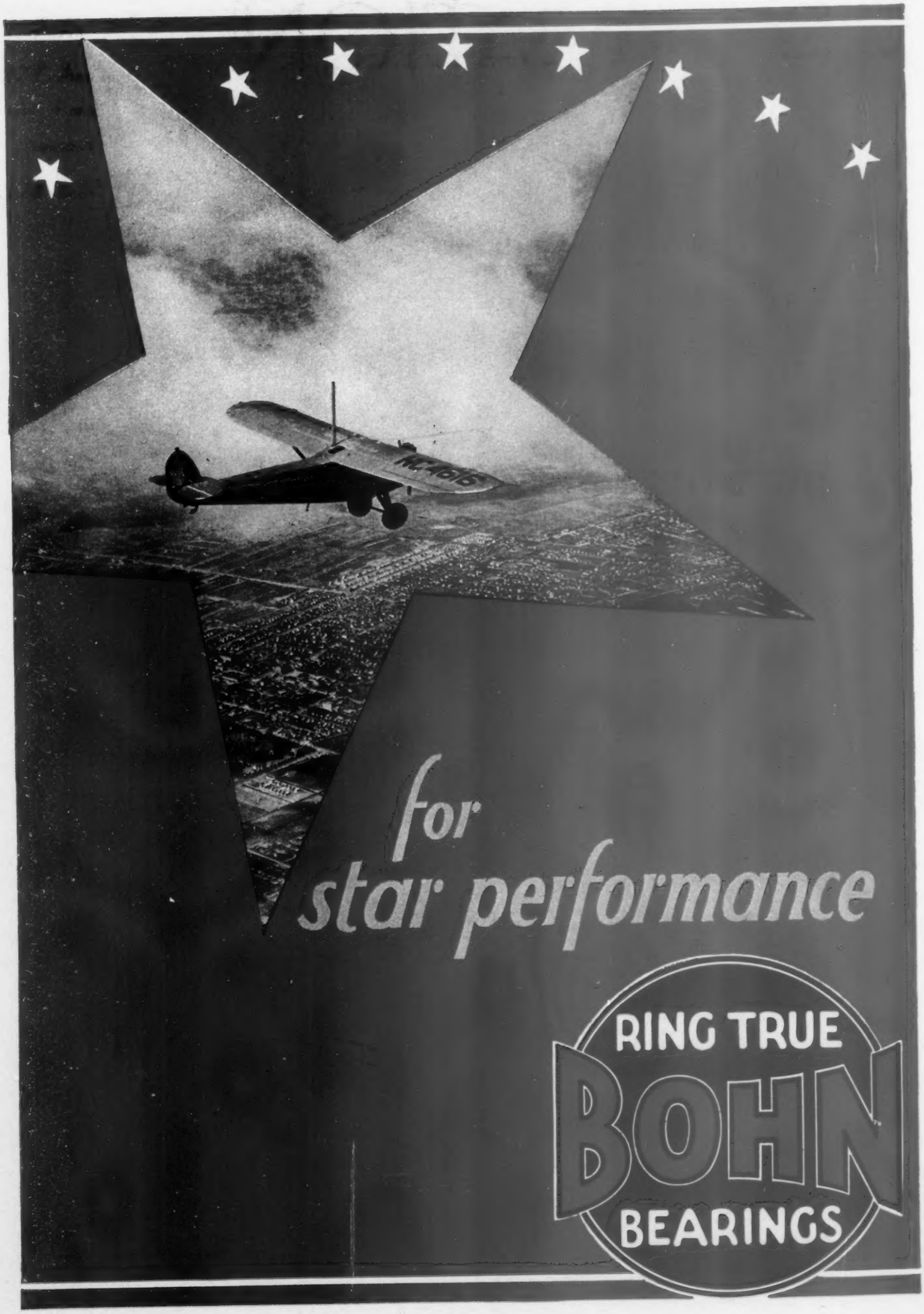
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AVIATION

The Oldest American Aeronautical Magazine

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Volume 28, Number 23

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Making Aerial Mapping Pay **1125**
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COMING

¶Signing up the Business Market. ¶The Canadian Air Mail. ¶Coming descriptions—Travel Air Low Wing Monoplane, Savoia-Marchetti S-55

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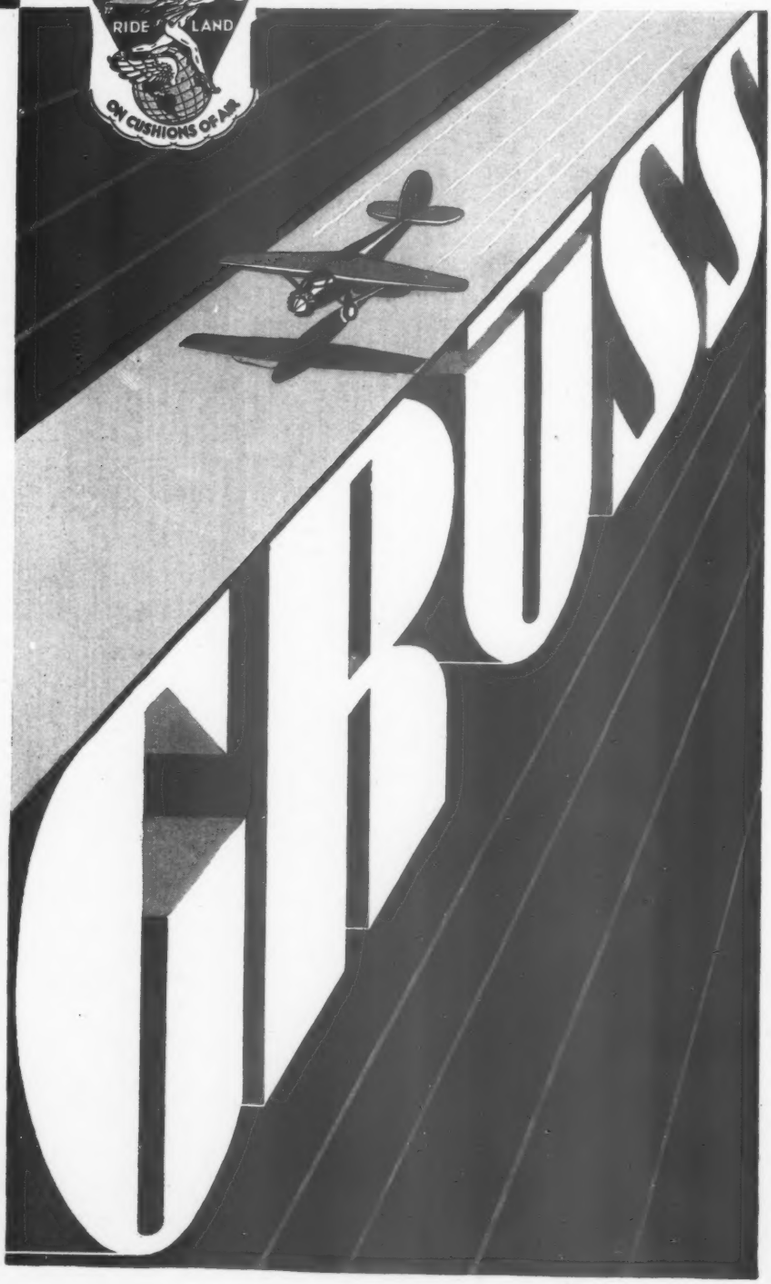

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NEXT YEAR — —

Next year, when the Navy holds the Annual Curtiss Marine Trophy Race, or the Army sends an Arctic Patrol on a gruelling mid-winter cross-continent jaunt, or the Air Corps Maneuvers are held, the performances and records will be still finer than the splendid achievements of this year. For in military aviation, there can be no compromise with progress. Superiority must be maintained at all cost.

Already, since January 1930, Curtiss has produced and delivered four new types of military aircraft to the Army and Navy. These include the remarkable XF8C-4, a two-seater carrier fighter for the Navy; the XP-10, a single seater Army pursuit with a top speed of well over 200 miles an hour; the O-26, Army observation plane, with still higher performance than the standard Falcon; and the XBT-4, a new basic training plane for the Army Air Corps. Each is superior to types now in service. And in the Curtiss engineering laboratories, still others are under development—development that goes on unceasingly to maintain our aerial supremacy.

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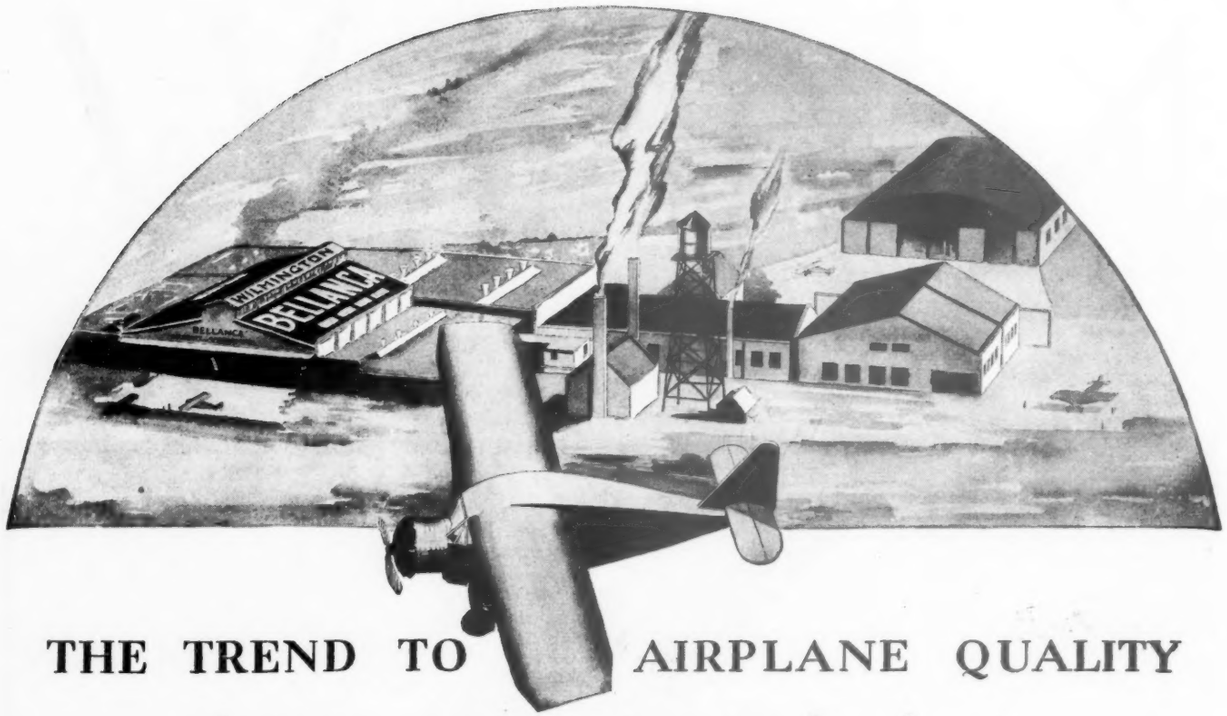

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brings engineering to the front

EXPERIENCE in various types of aircraft has already awakened thousands of men and women to the fact that there is, after all, a difference in airplane quality. People want to know *why* one plane stands out above all others for its higher degree of proved efficiency, longer life in service, greater ruggedness, steadier flying characteristics, and its cleaner score for safety.

Bellanca welcomes this trend to quality and dependability. Since 1908, Bellanca has refused to be diverted from the fundamentals of sound aerodynamics as proved in original features of airplane design. The Bellanca factory is the symbol of Bellanca progress. At this thoroughly equipped plant *the first consideration is the purchaser of Bellanca monoplanes.* To his satisfaction and safety, every effort is bent in terms of the finest materials obtainable, fabricated by a group of the most successful engineers in aviation. As a result, there is a real significance in the statement—"Built As Only Bellanca Can Build."

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BELLANCA

"Long may they save"!

IN the infinite laboratory of the upper air, scores of courageous men are doing hundreds of brave deeds for the advancement of aviation. Do any of us, in or out of the industry, often enough stop to consider the irreplaceable value of such contributions?

Fog Flying Experiment

Three years of organized effort to establish the principle of successful fog flying, through the Guggenheim Fund, was crowned by the actual flight achieved under these conditions September 24th last by James H. Doolittle.

Safe Airplane Contest

The difficult prescribed test flying of many new planes, the experimental products of widely different groups to meet the seemingly impossible conditions of this recent contest, called out every resource of flying skill of Lieut. Doolittle.

The Andes Flight

When that projected flight from Valparaiso, Chili, over the high Andes to Buenos Aires, found Jimmy Doolittle with two broken ankles in plaster casts, he called for crutches, hobbled to his plane...and flew the mountains! (See picture, on his arrival, below).

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First of all, such men do such deeds on their flaming faith in aviation. Their calm belief in themselves. But back of this, more than a decade of tried-and-tested experience has given them another faith. Doolittle carried this with him on each of the above flights when he didn't need it and on that memorable flight at the Air Races last Fall, when he did need it, and on writing us of which, he concluded:

"I am indebted to the Irving Air Chute Company for my life and thank you accordingly".

IRVIN AIR CHUTES

"The Life-Preserver of the Air"

"Happy Landings", our motion picture on standard width film, showing IRVIN Air Chutes in action, is available free of charge to schools, clubs and organizations interested in aviation. Send for booklet and particulars.

1002

The GOOD MECHANIC'S CHOICE for 33 years

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THE FLEETSTER

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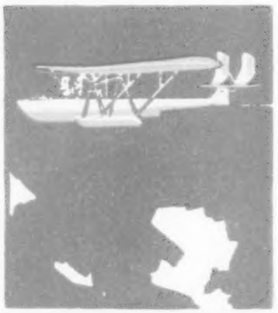
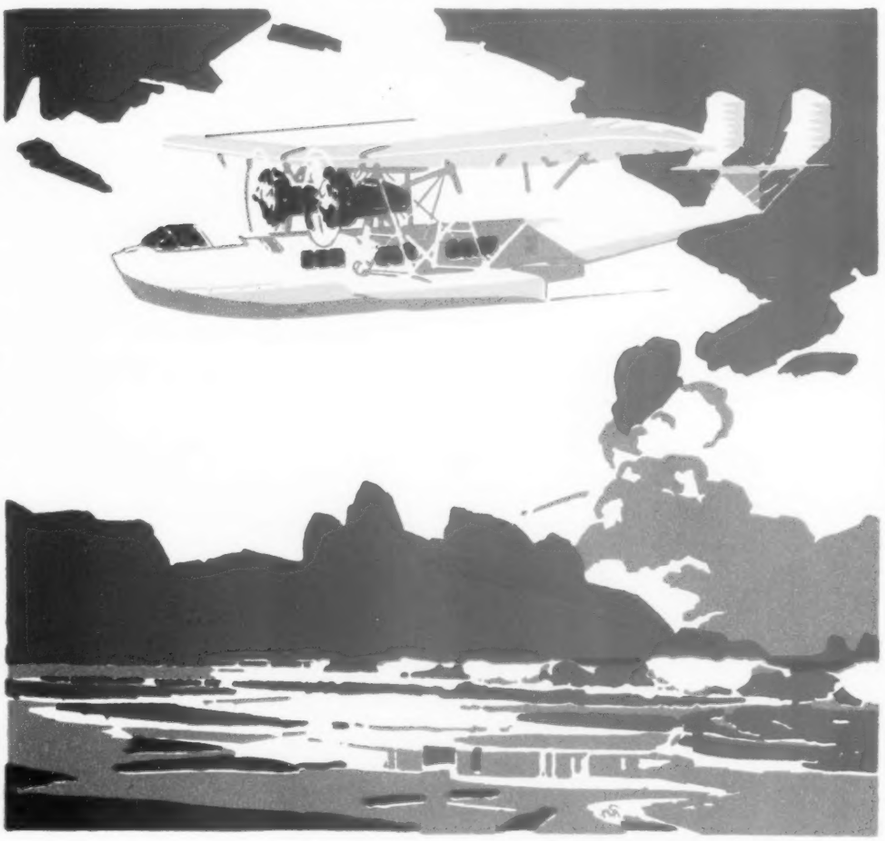
CONSOLIDATED AIRCRAFT CORPORATION, Buffalo, N. Y.

8000 MILES OF SKY ABOVE . . . AND WATER BELOW



In their eight-stage flight to Buenos Aires . . . the New York, Rio & Buenos Aires Lines' fleet of Commodore twenty-passenger Flying Boats annihilate time and distance for our business men trading in Latin America ... Nine days' flight as against a steamship's 21 days puts American industry on a par with European . . . the first to recognize the value of air-transport in foreign trade » » » Swift transportation of sales representatives, and time-saving air-mail correspondence gives our exporters and importers a distinct advantage » » » The COMMODORE . .. . with a useful load of 7600 pounds . . . has a cruising range of 1000 miles at 110 miles an hour. For use wherever there is water, the Commodore's freedom from landing field restrictions, has a distinct appeal to operators throughout North America.



Facts and figures regarding The Commodore will gladly be sent on request.

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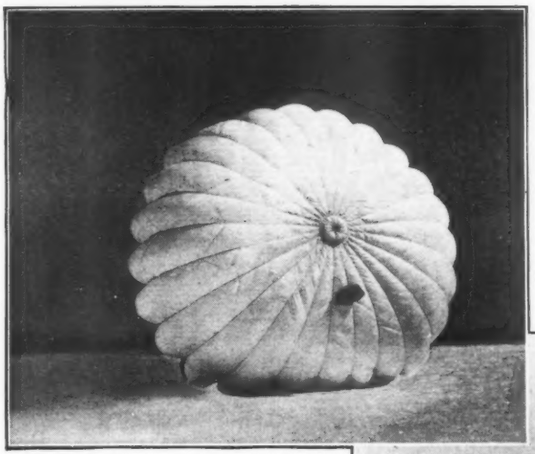
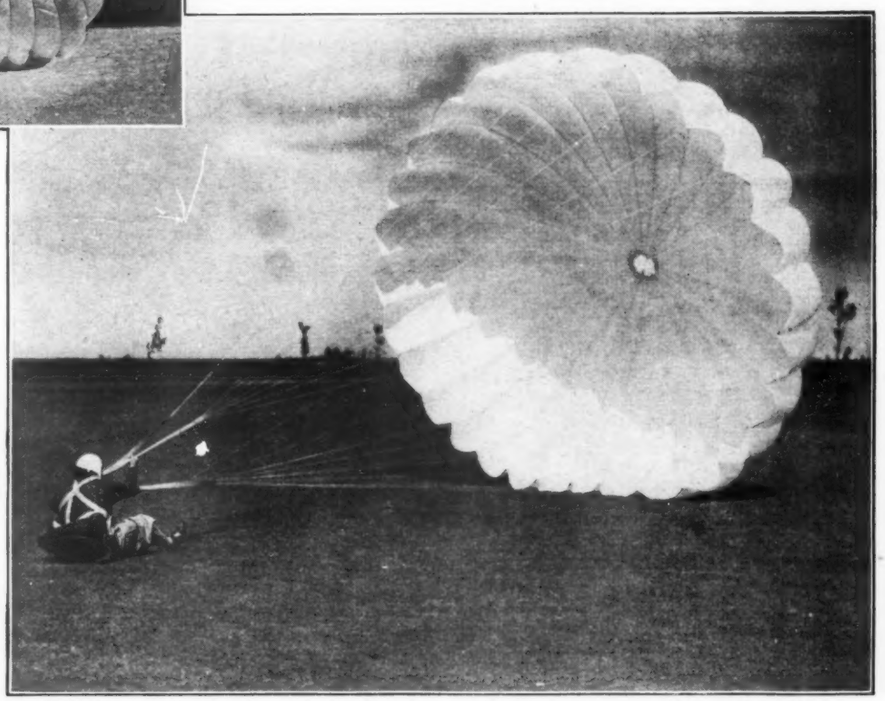


Why **BLACK** on **WHITE**?

The dark spot near the middle of the white canopy, in the picture at the left, shows one of the outstanding features that distinguishes the Floyd Smith Safety Chute from all others. It is the combination Pack Cover (before releasing) and Pilot Chute (after releasing). This combination makes the most compact, smoothest pack and the quickest-to-open Chute.



Floyd Smith Safety Chutes

—new improvements just recently made

Since the national announcements of my new Company, letters have come to my desk here in Buffalo from flying men and aviation organizations, the country over. All are interested in the new, greatly improved Chute that my new facilities and resources here enable me now to offer you.

THIS new Floyd Smith Safety Chute, accordingly, embodies all of the features that my nearly 20 years of flying and parachute work have proven to be sound and effective in aerial life-saving. But this is not all.

I have been able, here, to go a great step ahead in incorporating at once, many new improvements to this Chute that all will immediately recognize.

Outstanding among these, are the new canopies which are made from the same special white silk and are identically the same in design and construction as those used by all Air Forces of the United States and Great Britain and many other governments throughout the world. This international standard of Chute design and construction is more expensive to build but makes a stronger and safer parachute than any other type of construction known.

By the acid test of years of service trials in many countries this type has become universally recognized as the best Chute it is possible to manufacture.

Now, due to cross-license arrangements made by the Floyd Smith Safety Chute Co., I am able for the first time to give genuine Floyd Smith Safety Chutes with these important features, making them 100% automatic following their 100% manual control.

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Floyd Smith

SAFETY CHUTE COMPANY

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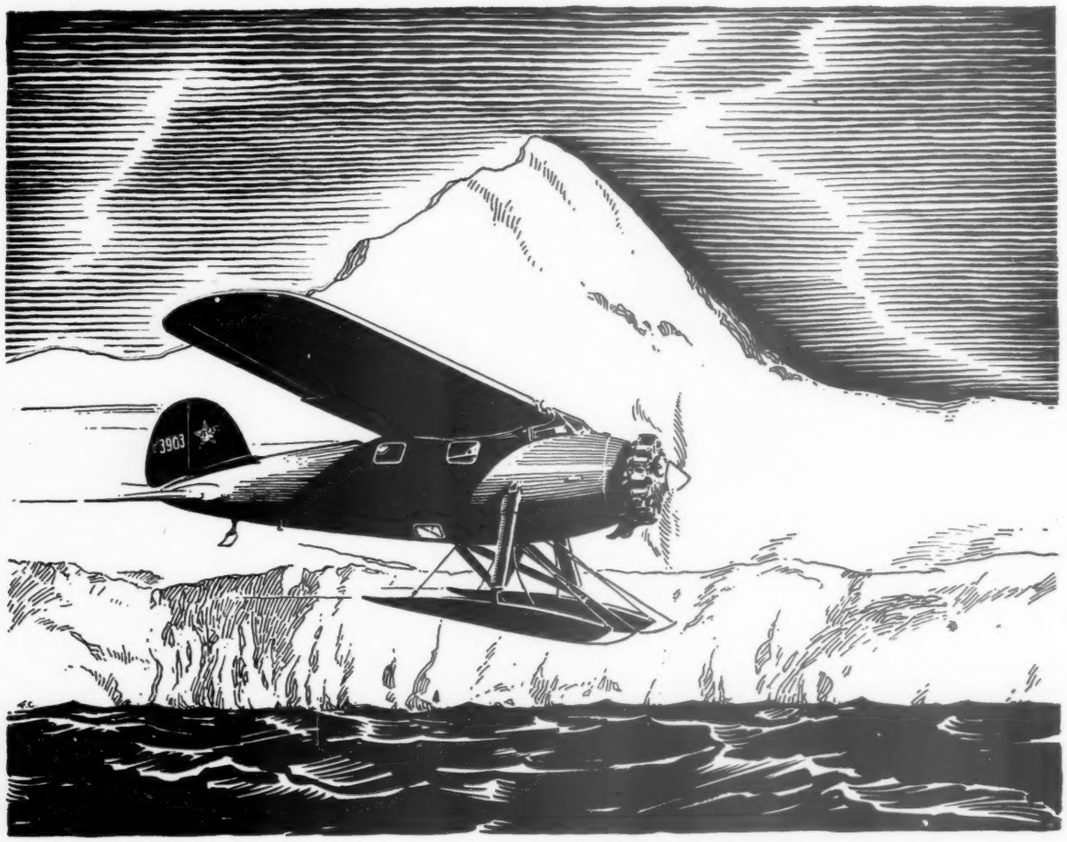

—and he named it the "LOCKHEED MOUNTAIN"

Captain Wilkins — pioneer explorer of both the Arctic and Antarctic by air—and the Lockheed plane which he used in his history-making polar flights

It stands at the bottom of the world, majestic and perennially snow-covered . . . Captain Sir George Hubert Wilkins was the first man ever to sight this Antarctic peak and he named it the "Lockheed Mountain" —in honor of the ship from which he discovered it.

Captain Wilkins chose a Lockheed for his polar expeditions by air because he knew "it was the finest ship available." He flew it over the top of the world on a 2,200-mile non-stop flight from Point Barrow, Alaska, to Spitzbergen. Later he took it, as one of two Lockheeds, to the Antarctic to explore the vast, mysterious wastes that surround the South Pole.

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A pilot of Arrowhead-International Airways, Inc.

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ROBERTSON *shares its* HANGAR BUILDING *experience*

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You will find that these Robertson engineers have probably had a definite experience with some airport problem exactly like yours, for they have been continuously engaged in the design and erection of hangars since the early days of the war . . . in the United States, Canada, Mexico, South America, England, Spain, Greece, Egypt, India, the Philippines, Hawaii, Panama and many other parts of the world.

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The illustration above shows one of the hangars of Pitcairn Aviation, Inc. at the Atlanta Airport, Hopeville, Ga. More than 13,000 square feet of Robertson Protected Metal (RPM) was used in the roof and walls of this hangar.

ROBERTSON
WORLD WIDE RPM **HANGAR BUILDING**
EXPERIENCE

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Without a recommended change

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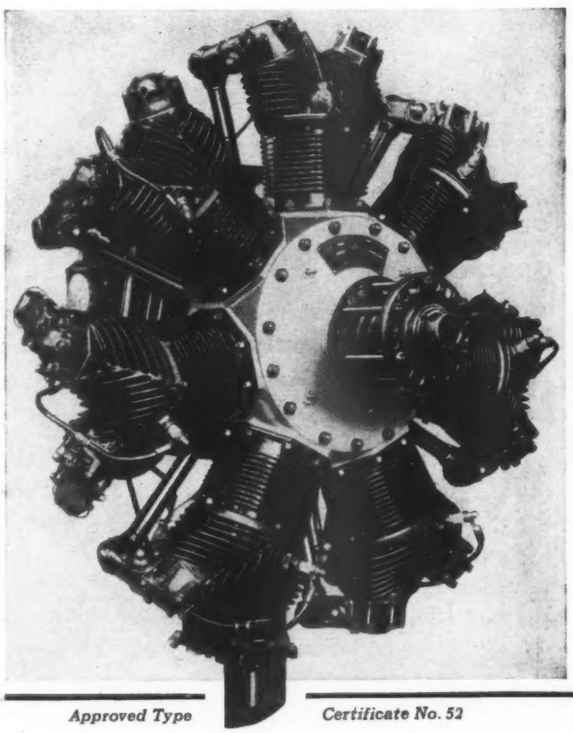

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Type	*7 cylinder - - Radial - - Air Cooled*		
Approved Rating	*110 H. P. at 2150 R. P. M.*		
Displacement	*372.4 cu. in.*		
Bore	*4.250 in.*	*Compression Ratio*	*5.4:1*
Stroke	*3.75 in.*	*Overall Diameter*	*33.25 in.*
Fuel Con.	*.52 lbs/H. P./Hr.*	*Overall Length*	*23 in.*
Oil Con.	*.015 lbs/H. P./Hr.*	*Weight (less Hub)*	*275 lbs.*

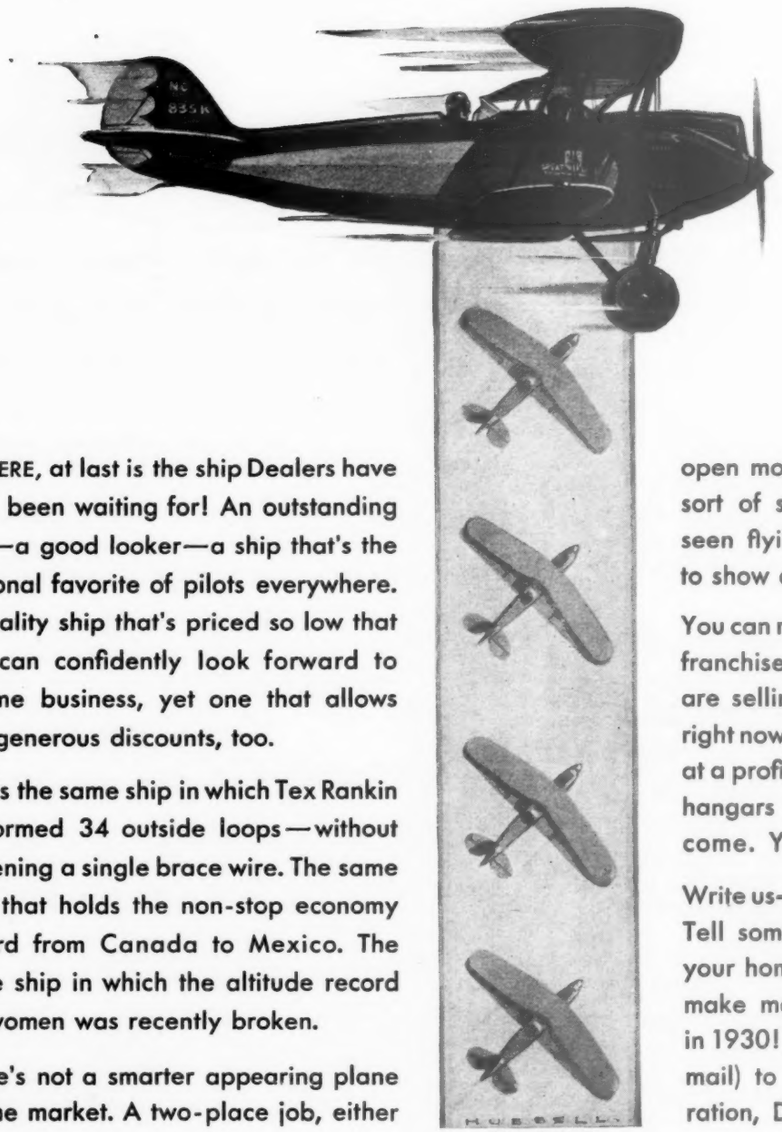
LE BLOND AIRCRAFT ENGINES

Send for details, facts and figures on the outstanding power, economy and special features of the new Le Blond "110". The price is right, consistent with Le Blond advanced engineering and quality standards. THE LE BLOND AIRCRAFT ENGINE CORP., CINCINNATI, U. S. A.

AIRCRAFT ENGINES LE BLOND MADE IN THE U.S.A.

At $3150

the GREAT LAKES SPORT-TRAINER should outsell all other ships!



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You can make money with a Great Lakes franchise. Great Lakes Operator-Dealers are selling Great Lakes Sport-Trainers right now—they are running their schools at a profit—they are maintaining service hangars that bring them a steady income. You can do the same thing.

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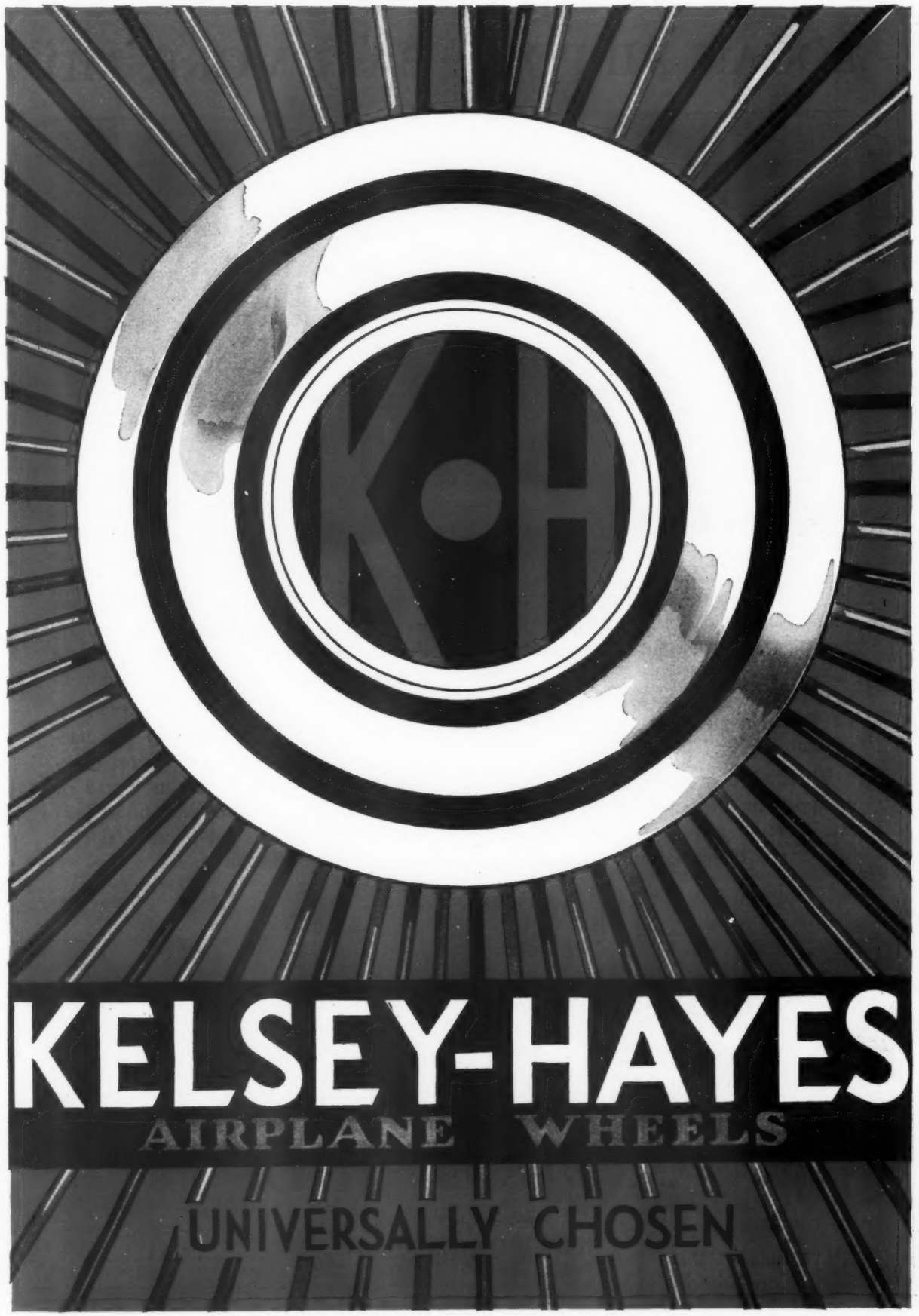
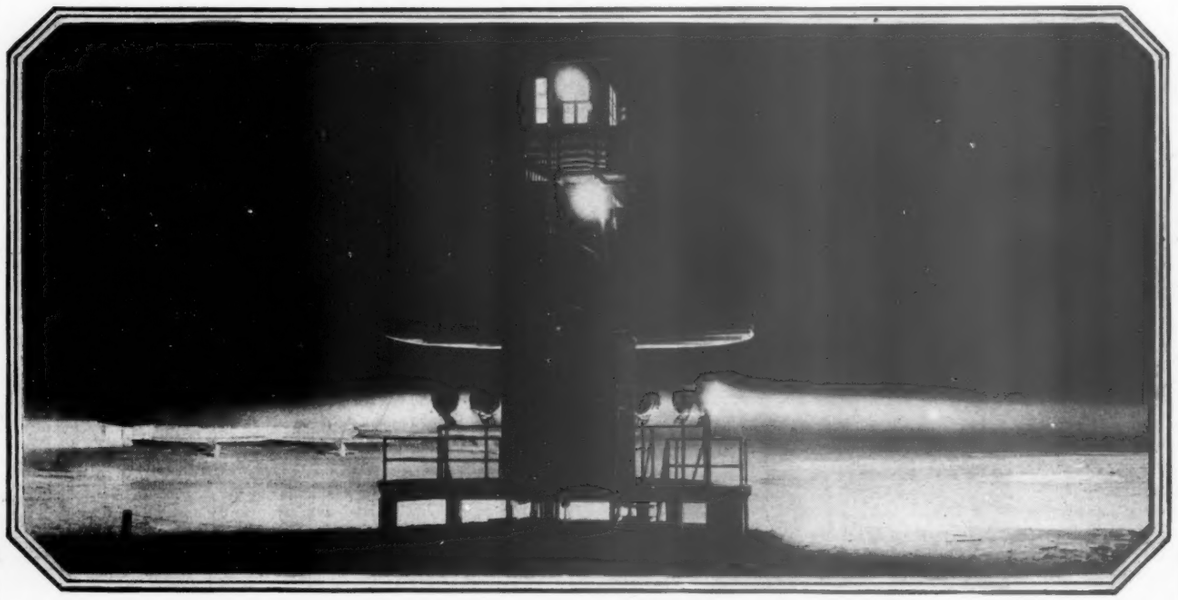
Contractors to the United States Army and Navy


K·H
KELSEY-HAYES
AIRPLANE WHEELS
UNIVERSALLY CHOSEN

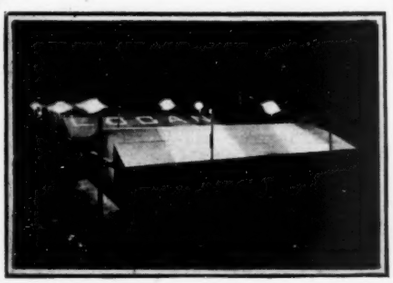
LOGAN AIRPORT, BALTIMORE, MD.



With the steady increase in air traffic there will be more and more night flying and those ports with the most complete lighting equipment will of course receive first consideration as a terminal for air lines offering a twenty-four hour service.

With this in view Baltimore has equipped its airport to take care of the safe operation of planes at night by installing Crouse-Hinds lighting equipment. The more important items included in the installation are the landing field floodlights, boundary lights, obstacle lights, hangar exterior floodlights, a ceiling projector and a ceiling height indicator.

The Crouse-Hinds Company manufactures a complete line of airport lighting equipment and maintains a staff of engineers who will gladly layout any airport lighting installation upon receipt of detailed plans.



CROUSE-HINDS

ESTABLISHED 1897

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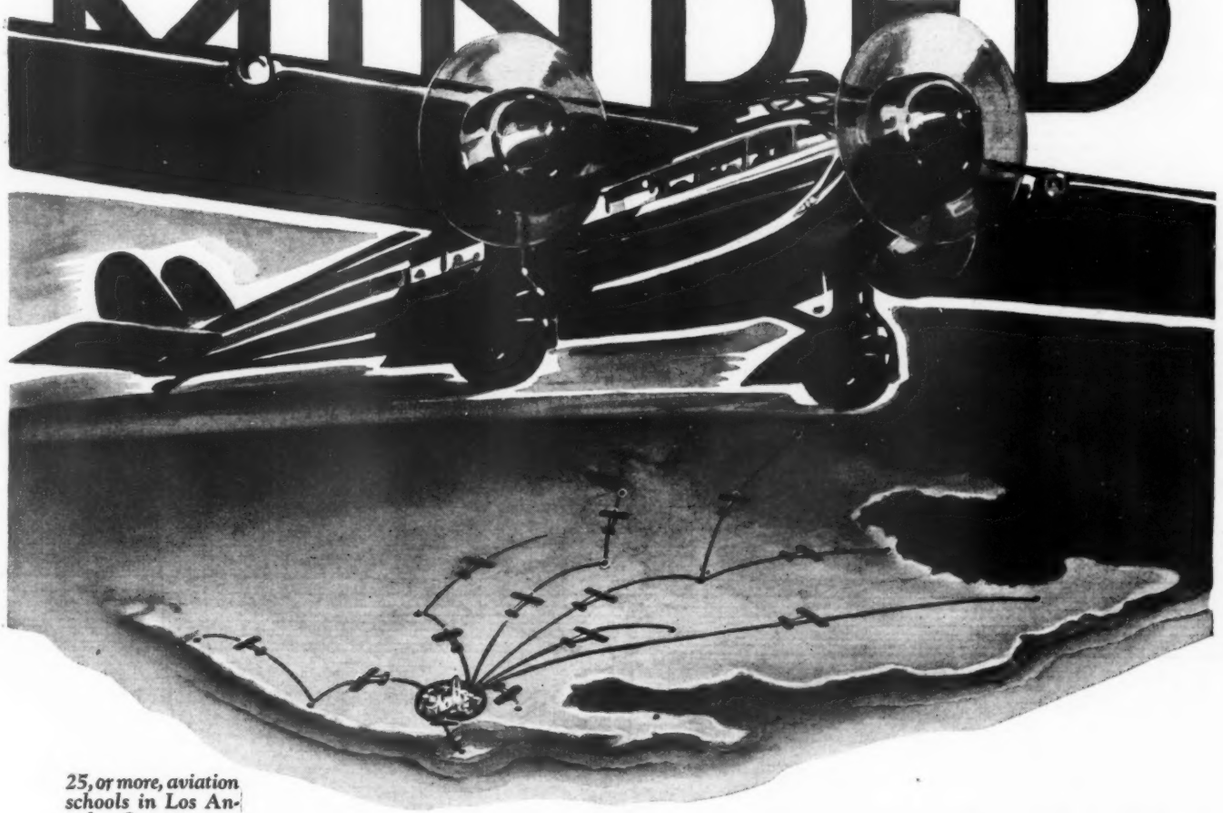
NEW YORK BOSTON PHILADELPHIA DETROIT ATLANTA MILWAUKEE CHICAGO ST. LOUIS CLEVELAND CINCINNATI MINNEAPOLIS PITTSBURGH LOS ANGELES SAN FRANCISCO DALLAS SEATTLE

C-H 524

AIR MINDED



25, or more, aviation schools in Los Angeles County now training over 1000 students.

$5,500,000 aircraft production here in 1929.

Low building costs.

Hydro-electric power, natural gas and fuel oil, and abundant water... all at low cost.

Contented labor and ideal living conditions.

Six transport companies operate nineteen regularly scheduled lines in and out of Los Angeles daily, to and from New York, Kansas City, Salt Lake City, El Paso, Dallas, Mexico City, Seattle, San Francisco, San Diego and other points.

Approximately 60 percent of all aviation in California centers in Los Angeles County. There are more licensed and identified aircraft here than in any other county in the U.S...57 airports and landing fields. The logical location for aircraft manufacturing.

For detailed information regarding aircraft manufacturing opportunities in Los Angeles County address Industrial Department, Los Angeles Chamber of Commerce

LOS ANGELES COUNTY

INTRODUCING LOW PRESSURE

U.S. ROYAL AIRPLANE TIRES

United States Rubber Company now introduces a most advanced and practical improvement in tires for aircraft. These low pressure tires provide increased safety in flying operations through easier landing, and ground performance is much improved. Larger ground contact permits flying from soft and muddy fields with safety.

These tires are scientifically designed and built by long-established standard production methods. Basic manufacturing processes, using Web-Cord construction and flatband building, are incorporated—thus giving greatest strength of tire with minimum weight.

Aerodynamic drag, weight and cost of the new tire and wheel assemblies are comparable in every way with present high-pressure equipment. The sizes now available are 6.50-10, 7.50-10, 8.50-10, 9.50-12 for landing wheels and the 5.00-4 for tail wheels. A full line of all sizes will shortly be available.

UNITED STATES RUBBER COMPANY—WORLD'S LARGEST PRODUCER OF RUBBER

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FOR BUSINESS AND PLEASURE FLYING

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...an airplane for everybody

..it almost flies itself
..it costs little to operate
..it can use small fields

The great new WACO "Model F" bears out all the finest traditions of WACO in superior design, satisfying performance and matchless value. Even to the casual observer it looks every inch an airplane. But nothing short of a flight demonstration will convince you just how good it really is. You, too, will be amazed that so much airplane can be bought for only $4100. Send for the new descriptive folder **F-1**

WACO AIRPLANES

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THE WACO GLIDER FOR FLIGHT TRAINING

Learn to fly in a WACO Glider! It's a fascinating sport and an easy way to get flight training at small expense. You can easily and quickly get the feel of the controls and the thrill of flight and have a tremendous lot of fun out of it. The price of the WACO Glider is only $385, which is less than the average flying school fee for primary instruction. A few of you can get together, form a Glider Club, share the price of the glider . . . and the fun is on. The WACO Glider is designed and built to WACO standards of craftsmanship. Get full details from folder **G-1**

THE WACO AIRCRAFT COMPANY, TROY, OHIO

CORSAIRS

IN FOREIGN WATERS . . .

with the ASIATIC FLEET

SERVICE in the United States Navy may mean duty anywhere in the world. This is as true of airplanes as of men and battleships.

***Corsair* No. A-7929 has seen most of its service with the Asiatic Fleet —first with a Light Cruiser Division on board the U.S.S. Trenton, later with the Memphis.**

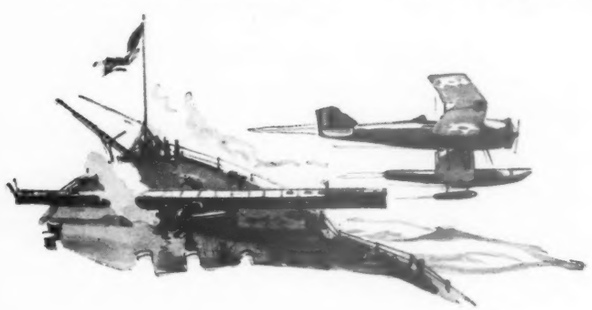
Its duties have been among the hardest any naval plane can undertake—observation.

As a naval observation plane it has been constantly catapulted into the air from the ship. Landings are made alongside the ship. Then the plane is picked up by a crane and swung aboard.

Such catapulting is naturally a severe strain on an airplane. A ship making ordinary take-offs from a smooth airport undergoes no strain which in any manner approaches it.

***Corsairs* are designed not only for extreme maneuverability but for a ruggedness far beyond ordinary requirements — a staunchness that enables them to meet demands few planes of any type are called upon to meet. Their performance has made them the delight of all naval pilots who fly them. CHANCE VOUGHT CORPORATION, Hartford, Connecticut. Division of United Aircraft & Transport Corporation.**

CHANCE VOUGHT CORPORATION



Are You Compressed Air-Minded?

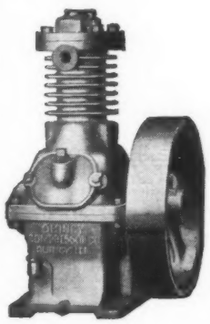
While the public is becoming "air-minded," Airport operators and Airplane manufacturers are rapidly becoming conscious of the tremendous value of compressed air *to them.*

At the Airports, compressed air is spraying paint and dope, cleaning engines, blowing out gas and oil lines, inflating tires, etc. Plane Manufacturers are using it to operate all kinds of pneumatic tools as well as for paint and dope spraying.

Compressed air is so convenient, so flexible, so economical!

Model W

Water cooled. Four sizes, from 4 x 3½ to 5¼ x 5—Duplex Displacements from 15 to 128 cu. ft.



Model A

Air cooled. Six sizes, from 1⅝ x 1½ to 4¼ x 5. Displacements from 1 to 27 cu. ft. Tight and loose or V type pulleys if desired.

Quincy Compressors

are the very utmost in compressor value today. They represent the best engineering brains in this industry—and the "factory ideals" measure right up to the engineering.

Quincy Compressors are economical to operate; economical to maintain; and they deliver all the air and all the pressure their specifications call for.

Furthermore, every Quincy Salesman is *factory trained*—thoroughly capable of recommending the right compressor for your needs and of servicing it after installation.

Get all the facts about Quincy Compressors. Write or use the coupon.

Model G-18

Two-stage, fully automatic. Displacement, 3¾ cu.ft. with ¾ H.P. motor, 4½ cu.ft. with 1 H.P. motor, 6 cu.ft. with 1½ H.P. motor. Tank, 20 x 48, 65 gals.

Quincy Compressor Co.
208 Maine St., Quincy, Ill.

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SAVE rental cost—build up your flying hours—own your own plane on easy terms—and earn while you pay. Every ship is licensed for passenger carrying Many are demonstrators in the pink-of-condition. All have been inspected, checked, put in good flying condition and certified by Curtiss-Wright. Fine flying weather is here now. With a choice of reputable makes, this is your opportunity for pleasure, business, transport or training.

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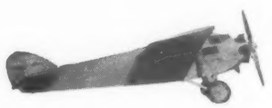
ROBIN—A comfortable, 3-place cabin monoplane—OX engine—D. C. No. 171E—only 58 hours of use—now on display at the Louisville, Kentucky, base—bargain price: $1,975.

TRAVEL AIR—The popular 3-place open biplane—Hisso 150 h. p. engine—D. C. No. C6149—128 hours—completely rebuilt and a beauty—Baltimore, base—price: $2,300.

CESSNA—The 4-place cabin type—225 h.p. Wright Whirlwind engine—D. C. No. NC-6444—only 13 hours in the air—at the Los Angeles, California, base—bargain price: $6,435.



COMMANDAIRE—(Trainer)—2-place open biplane—OX engine—D. C. No. NC-584E—only 10 hours in service—Bridgeport, Conn., base—bargain price: $1,750.

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1. Only **licensed** aircraft and engines are accepted in trade.
2. Used equipment sold only when it is **airworthy.**
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COLUMBIA..South Carolina
COLUMBUS.....Ohio
DALLAS.....Texas
DENVER.....Colorado
DETROIT.....Michigan
HARTFORD.....Connecticut
HOUSTON.....Texas
INDIANAPOLIS.....Indiana
KANSAS CITY.....Kansas
LOS ANGELES....California
LOUISVILLE.....Kentucky
MEMPHIS.....Tennessee
MIAMI.....Florida
MILWAUKEE.....Wisconsin
MOLINE.....Illinois
NEW YORK.....New York
NORTH BEACH.Long Island
OKLAHOMA CITY
Oklahoma
PITTSBURGH....Pennsylvania
PORTLAND.....Maine
RALEIGH....North Carolina
ROCKLAND.....Maine
ST. LOUIS.....Missouri
SAN FRANCISCO
California
TOLEDO.....Ohio
VALLEY STREAM.New York

ROBIN — 3-place Cabin type, OX Engine, D. C. No. NC63H, 59 hours, base Cleveland . $1,950

ROBIN — 3-place Cabin type, OX Engine, D. C. No. C9209, 155 hours, base Raleigh, N. C. $1,475

ROBIN — 3-place Cabin type, Challenger Engine, D. C. No. NC9276, 188 hours, base Baltimore $4,500

ROBIN — 3-place Cabin type, Challenger Engine. D. C. No. NC372K, 179 hours, base Denver $4,500

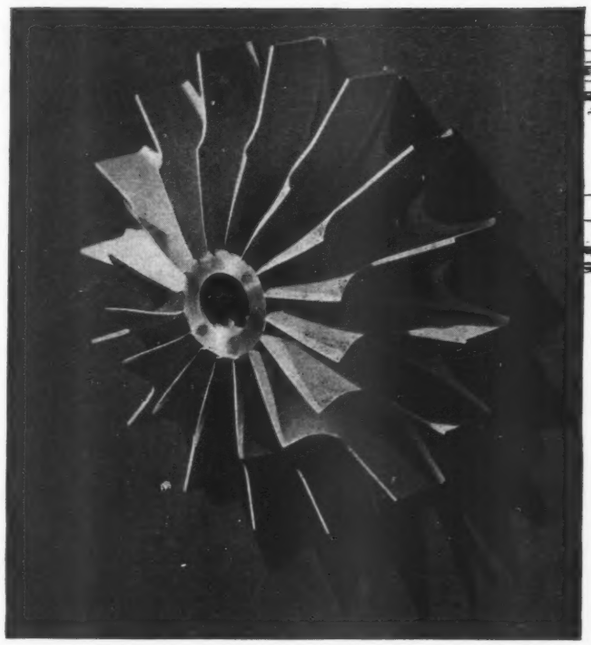
ROBIN — 3-place Cabin type, Challenger Engine, D. C. No. NC9294, 235 hours, base Boston $4,225

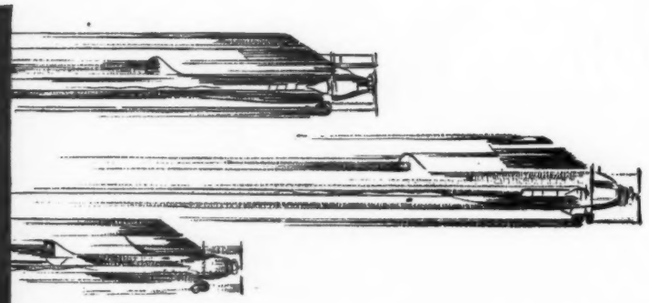
CESSNA — 4-place Cabin type, 300 Whirlwind Engine, D.C.No. NC301M, 15 hours, base Miami $7,850

CESSNA — 4-place Cabin type, Warner Engine, D.C. No. NC8792, 124 hours, base Oklahoma City $3,430

COMMANDAIRE—3-place Op. Biplane, Warner Engine, D.C. No. NC608E, 85 hours, base Caldwell, N. J. $3,445

COMMANDAIRE—3-place Op. Biplane, 165 Whirlwind Engine, D. C. No. NC977E, 49 hours, base Kansas City. $4,775





The General Electric supercharger consists of an impeller, or wheel, located in a specially designed passage between the carburetor and the intake manifold. It is usually driven by gearing to the crankshaft of the engine. The results are increased power through increased pressure at the intake manifold plus improved vaporization and distribution of the fuel mixture.

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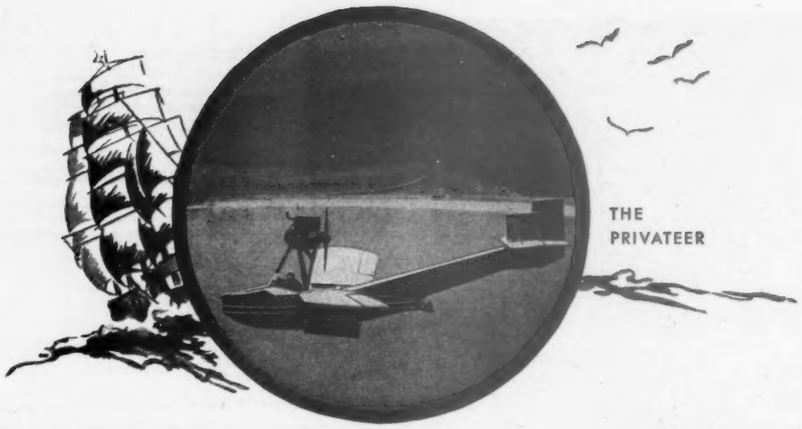
A TRIUMPH OF ENGINEERING SKILL

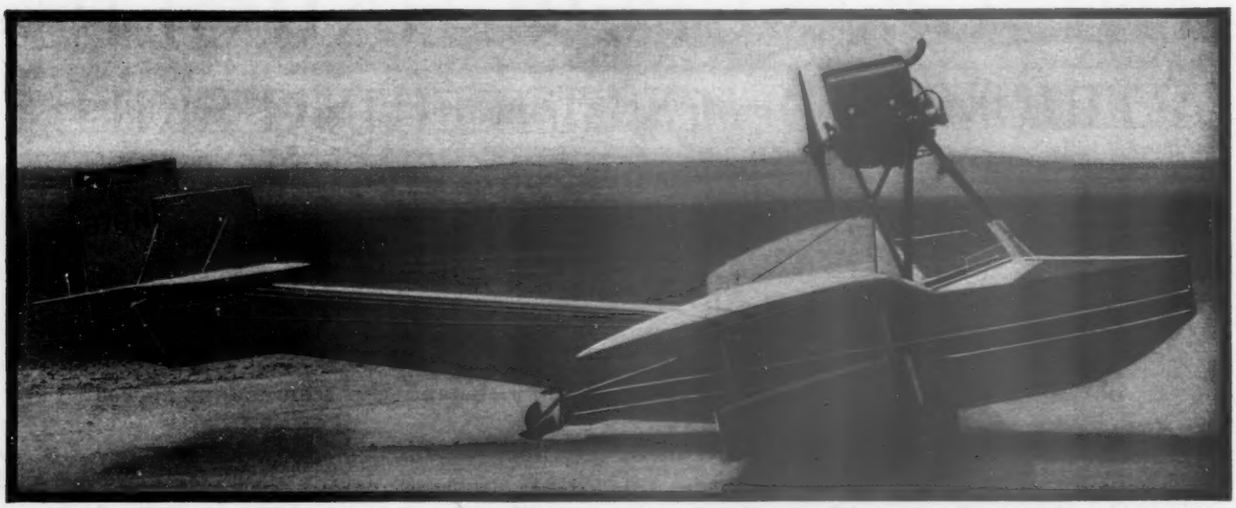
THE IMPELLER, or wheel, is the heart of the G-E supercharger; the very life of the engine depends upon it. Rotating speeds of 30,000 rpm. are not uncommon to this small wheel. But to withstand the tremendous forces which are met at such speeds requires the most careful consideration of every detail in its design and construction. General Electric engineers have specialized every process in its manufacture, from the selection of raw material to the balancing of the finished product. The skill and technique acquired through the building of thousands of high-speed turbines and compressors have contributed much to the success of more than 8,000 G-E superchargers now in service. We invite your interest. Write us—General Electric Company, Schenectady, N. Y.

321-45

GENERAL ELECTRIC
AËRONAUTIC EQUIPMENT



Lowest Priced Amphibion in the world!
$5,550



At a time when Department of Commerce figures show a 363 per cent increase in amphibions and only 51% in land planes, IRELAND rolls out of the hangar the lowest priced amphibion in the world... the smart, trim PRIVATEER.

A $5,550 safe, swanky ship pointing its nose right into the biggest buying trend.

The economic answer to that vast group that has become air-minded but seeks the DUAL-SAFETY and the DUAL-PLEASURES of a combination land and water plane.

The handsome PRIVATEER is a perfected plane. Its smooth performance is a revelation. Seats two comfortably . . . has a gross weight, including useful load, of only 1,595 lbs. . . is powered with a 100 H. P. Wright "Gypsy" . . . a high speed of 81 miles per hour . . . a cruising speed of 68 . . . a landing speed of 41 . . . a cruising range of 290 miles . . . takes off land in less than 6 seconds, off water in less than 10 . . . and can be dismantled and re-assembled in an amazingly short time.

Of course, the PRIVATEER will "go big" . . . so big that you will want to have the agency for your territory. Get the fast turnover that low price always assures . . . and the big profits that volume sales provide. Write now . . . while territorial appointments are being made.

For PRIVATEER is the headliner of the IRELAND "Big Four"— four fine, time-tested models providing an amphibion for every purse . . . $4,890 (flying boat) to $23,000. Ireland Aircraft, Inc., Garden City, Long Island, New York.

IRELAND *Privateer*

AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . . . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 28. . . *June 7, 1930* . . . NUMBER 23

Taking Prohibitions Off Foreign Trade

MOST of the civilized countries of the world now license civil aircraft, and impose some sort of airworthiness requirements. All of the 27 nations that have ratified the International Air Navigation Convention have pledged themselves to do so, and to exact some reasonable structural and aerodynamic standards from all the machines that fly the national colors. In most of the countries where aviation has been very highly developed, including all of the "great Powers," the preliminary tests include an inspection of the plane during the process of construction. The licensing of foreign-built planes then becomes impossible, and foreign trade in airplanes is swept off the boards at a stroke, except for exports of military craft and shipments to countries that have no industry of their own and cannot afford to be unduly severe in their stipulations.

Under a strict application of the rules, no airplane can well qualify for an American license without having been built here. Still more certainly, no airplane can be licensed in Great Britain, without special derogation from the letter of the rules by courtesy of the government or by international agreement, unless it is the product of a British factory. All the evils that economists find in high tariffs are magnified manyfold in this complete stoppage of trade,—a stoppage, incidentally, that contravenes the spirit if not the letter of the recently-framed League of Nations Convention on Prohibitions and Limitations on the International Exchange of Goods.

There are, of course, some voices raised in favor of these international barriers. The same arguments that are aligned behind a tariff copiously and inflexibly protective are trotted out in support of expedients to bar all imports. There are American manufacturers who consider that the exclusion from the American market of French and German airplanes, made with cheaper labor than ours and in some instances with special advantages afforded by their governments, should be the first consideration, and that it does not matter how the exclusion is accomplished. There are no doubt leaders in the British industry, to take a single foreign example, who feel that the market in the British Dominions should so far as possible be reserved for British planes, and that the exclusion of the British machines from the United States will be a small price to pay for the privilege of keeping the American product out of the Empire.

No doubt such groups exist in both countries, and in other lands as well, but they are all wrong. Should their views prevail, they might gain some temporary advantages, but in the long run they would have occasion to regret it. There are no recorded exceptions to the rule that a reasonably free flow of trade is in the general interest. Our foreign readers may feel that the statement comes with questionable grace from a nation enamored of a high tariff, but we made it with conviction. To attempt to treat aircraft as constituting an exception is to initiate a series of reprisals and counter-reprisals that will not only prevent foreign trade in airplanes, including some that has already become very profitable, but will seriously restrict the freedom of international travel by air.

Assuming general agreement on the proposition that protective measures should present themselves frankly as such, and that a concealed protection under the cloak of safety regulation is inexcusable, there are two possible procedures, but only one practicable one. First, each nation may apply its own regulations to the imported machines at the source. Before the Aeronautics Branch was fully functioning the Canadian government arranged for its own inspection of the machines built for

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Canadian order in the United States, and much more recently the British Air Ministry has had resident inspectors at at least one plant in continental Europe. Obviously that is a lame and halting expedient, not to be dreamed of on a grand scale. The Department of Commerce has quite enough troubles in the United States without attempting to keep its representatives in half the factories of Europe, passing on and earmarking the machines that are to be shipped to America.

The other alternative is the working out of intergovernmental agreements for the mutual recognition of airworthiness certificates. It is upon that line that the Department of Commerce has been working, so far with very limited success. There is no want of will to negotiate, but a narrowly technical attitude will render any negotiations sterile. We may have one method of determining the stresses on the wing structure in a dive, and the British or Germans, another. Both may be sound, yet they differ, and if the technicians are allowed to argue the question they can debate it for seven years and never reach a conclusion upon which is the better. If mutual international recognition is to wait upon the development of identical standards of airworthiness the present generation will hardly see it accomplished.

There is one reasonable way, and only one. We commend it not only to our own government, but to all the others of the earth. It is the way of the United States and Canada, whose aeronautical relations attain the absolute ideal. It is the way of mutual confidence.

As between any two of half a dozen governments that could be named, including our own, it is fair to presume that both parties want to make flying safe within their own boundaries. It is fair to assume that they have made a reasonably intelligent effort to do so, that the rules which they enforce upon their own industry embody the results of that effort, and that they can be taken as a satisfactory equivalent of a totally different body of regulation built up in another country with the same fundamental aim. Then forget the technical questions. If the government of the United States and that of state X, a European power with high standards of aircraft construction, will deal with each other on those lines we are sure that neither will ever regret it.

It only remains to be seen how many governments will have the courage to cut adrift the red tape that binds them to their own inhibitions. We rely on the powers at Washington to lead the way.

//

Why Not?

AIRCRAFT, more than any other modern industry, has stirred the imagination and incited the ambition of industrial leaders in all branches of manufacturing endeavor. When keen industrial observers chose to discover in aviation the next big "mass production industry", it was but natural that they should each in their own way seek to unearth a channel for the participation of their own organizations in this rapidly growing air industry. As a consequence, many organizations whose primary products are far from aeronautic, have allotted to themselves certain units, which when made available to the aircraft industry as a whole, have released mass production methods and advantages far in advance of what the aircraft industry itself, acting through its many individual airplant manufacturing companies, could even dream of doing. Of the value of these contributions to aeronautical advancement there can be no question.

However, when a complex industrial situation reluctantly drives home the realization that the demand for particular designs of completed aircraft does not permit of the application of these same mass production methods to the fabrication of the entire plane, and in many instances temporarily does not even utilize existing special manufacturing facilities, isn't there a lesson to be learned by the airplane manufacturer himself? Just as other industries looked to aviation as a source of further utilization of mass production facilities already existent, why should not the airplane manufacturer look to other industries for the utilization of highly specialized manufacturing facilities now likewise in need of orders to keep fully busy?

The airplane manufacturer has an ideal organization for the manufacture of special assemblies, especially in the light metals. He has modern equipment, highly skilled mechanics, and a resourceful technical force. In mass production, of course, he cannot compete without extensive physical reorganization and readjustment, but when it comes to the custom built luxury field he needs but a mental readjustment.

Without attempting to directly point out such possible extension of activity, but merely to crystallize and illustrate the thought, may we refer to light metal manufacture as it might be applied to custom built assemblies in the nautical field such as racing shells, small harbor craft and powered pleasure boats; in the automobile field such as custom built bodies for pleasure cars, racing car bodies and special truck bodies; in the office equipment field for special built-in cabinets, files and furniture.

In addition to the physical facilities available for such special work, the very clientele contact for airplane sales is generally the best source of prospects for special luxury design.

The airplane manufacturer is by natural selection and training a man of resource and initiative. To bring these qualities to bear in the present situation will do much to maintain him as such, and to preserve intact the morale which is the very fibre of his organization. It appears that in some measure at least, turnabout would be fair play—as well as good business.

Mermoz Shows the Way

HAVING BEEN virulent in our opposition to ocean flying as a stunt, it is with special pleasure that we lead the cheering for a trans-Atlantic performance out of the stunt class. Almost on the third anniversary of the flight by which Lindbergh proved the possibility of a non-stop passage between the United States and Europe under favorable conditions, the pilot of the Compagnie Aeropostale in whose honor we write has made the first aerial crossing between the Eastern and the Western hemispheres under something approaching commercial conditions. Though Mermoz' voyage was infinitely less spectacular than those of Lindbergh, Chamberlin, Byrd, and Koehl, none of them outrank it in real significance. For the lack of spectacular quality, indeed, the French company should be grateful. That is the one thing that a commercial service must not have. When it is necessary to heap encomiums upon the pilot's daring and endurance we can be assured that the service will not long continue upon a regular schedule. If the successful completion of a flight upon a single occasion calls for wondering applause, the laws of probability are all against there being a hundred or a thousand successful completions in succession. The first condition of commercial operation is that we should be able to take the smooth functioning of any individual element for granted, deserving neither praise nor comment.

The greatest honor that can be done to Mermoz' flight, therefore, is to treat it not as a marvel in itself but as the inauguration of an indefinite series. Whether it will actually turn out that way or whether, as in the case of the Ile de France catapult experiment, the difficulties will prove more formidable than is anticipated and cause a temporary abandonment until better equipment can be developed remains to be seen. The undertaking is a bold one, but it has at least a fair chance of success.

Three years ago next month, when one Atlantic flight, —*the* flight,—had been made and others were in prospect, when we were all a little hysterical, there was a profusion of predictions that regular trans-oceanic service with mail and passengers was just around the corner. It is a long corner, for there is little sign that we are turning it yet, so far as the North Atlantic is concerned. The South Atlantic is another story. With fewer storms, more constant winds, and a much shorter course, no longer in fact than that from California to Hawaii, it comes barely within the reach of possibility for regular operation with planes of the highest efficiency and with a little mail load. Using seaplanes, and with three high-speed vessels maintained on a permanent mid-oceanic patrol, the hazard is reduced to a point that makes it proper to try the venture, although the cost is obviously immense.

While we of the United States will feel some gratification that the initiative of the Pan-American Company had established a regular aerial connection between our own territory and the southernmost capitals of South America before one was set up from Europe, no national feeling need stint our admiration for the Aeropostale undertaking, nor detract from the sincerity with which we wish them a complete freedom from troubles.

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More Discussion and Less Reading

THERE IS nothing so helpful to struggling businessmen as a get-together with competitors for an interchange of views and ideas. Every industry has its various associations which convene one or more times during the year, and much of the progress of those industries can be traced to discussion behind closed doors of the committee room.

In the aviation industry, though, there seems to be considerable room for improvement in conference work. Opinions expressed to us at various times lead us to believe that even the majority is not getting maximum value from aero conferences.

To begin with, it seems that the work of the convening conference is often mapped out ahead of time. Various individuals are asked to present papers on subjects sometimes suggested, but often left to the judgment of the individual. The result is that four-fifths of the meeting is taken up with the reading of papers, the contents of which may be extremely interesting, but is of no assistance to the man who has come hundreds of miles for the opportunity to hash over his problems with others who may be staggering under the same load.

In the opinion of many the best conference ever held in the aeronautic industry was the meeting of the industry with the Aeronautics Branch in Washington, D. C., in December, 1927. That affair was not a presentation of prepared papers. It was a general get-together that gave every attending member the feeling that he could let loose many things that had been sticking in his mind. Every one had a chance to take part in the discussion.

Of recent months, though, conference meetings have not satisfied many of the attending members. They came prepared to discuss, remained only to listen, and departed with their problems still in the unsolved state. To correct this situation we suggest that considerably less time be given to the reading of prepared papers, and that the conference be thrown open to general discussion of problems affecting the majority of those attending. This suggestion is by no means new. In fact it has been tried, and with great success. The trouble is that the idea is not being practiced more generally. It is our firm belief that if it were, considerably more would be accomplished and to the more complete satisfaction of those who expended time and money to be present.

OPERATING *Short Haul* AIR

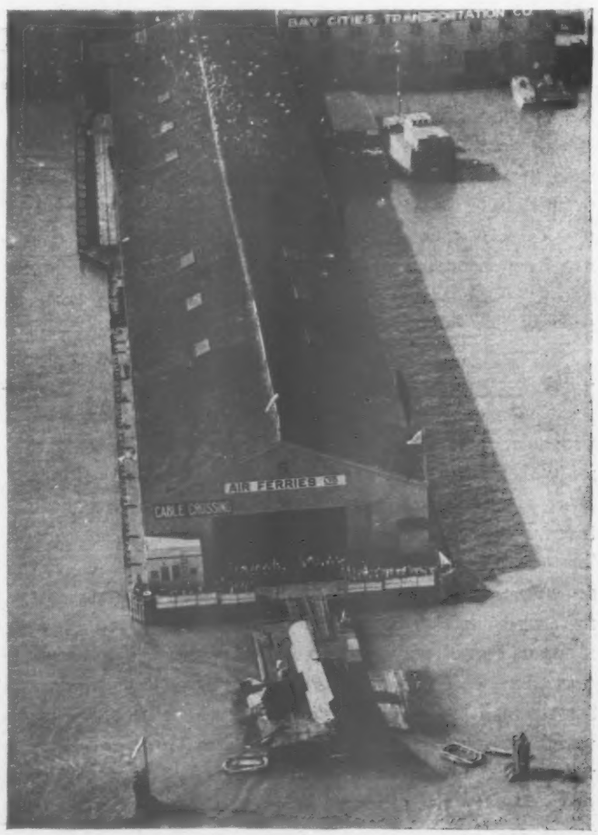
Air Ferries, Ltd., Operation Between San Francisco and Oakland Record That Indicates Possibilities for This Type

By CHARLES F. McREYNOLDS
Pacific Coast Editor of AVIATION

WORLD-WIDE attention has been attracted to the operations of Air Ferries, Ltd., which inaugurated an amphibion service on Feb. 1, 1930, operating between San Francisco and Oakland across six miles of open bay on a six-minute schedule from dock to dock. Keystone-Loening amphibion biplanes have been used in this service, with a full-load capacity of seven passengers and two pilots. Dock arrangements have been even superior to the water ferries, with planes landing at Pier 5 on the San Francisco side, within one block of the Ferry Bldg. and Market St., while landings on the Oakland side are made at the foot of Franklin St., adjacent to the First and Broadway Railway Station and within three blocks of the Oakland City Hall. There have been two outstanding reasons for the wide notice which this service has received. It is the shortest and most frequent regularly scheduled air service in the world, and it has enjoyed a phenomenal volume of traffic, 11,391 paying passengers being carried in the first 30 days of operations and 21,000 passengers in the first 60 days of operations. This in spite of the fact that the service was started during the worst season of the year, from the standpoint of weather.

The outstanding success which has attended the service inaugurated by Air Ferries, Ltd., has lent new significance to the possibilities of short-haul air services as they might be made to fit into the transportation pattern of many portions of the country. There have been other examples of similar services operated with success prior to the formation of Air Ferries, Ltd., which give us a picture of the broad possibilities of air ferry lines.

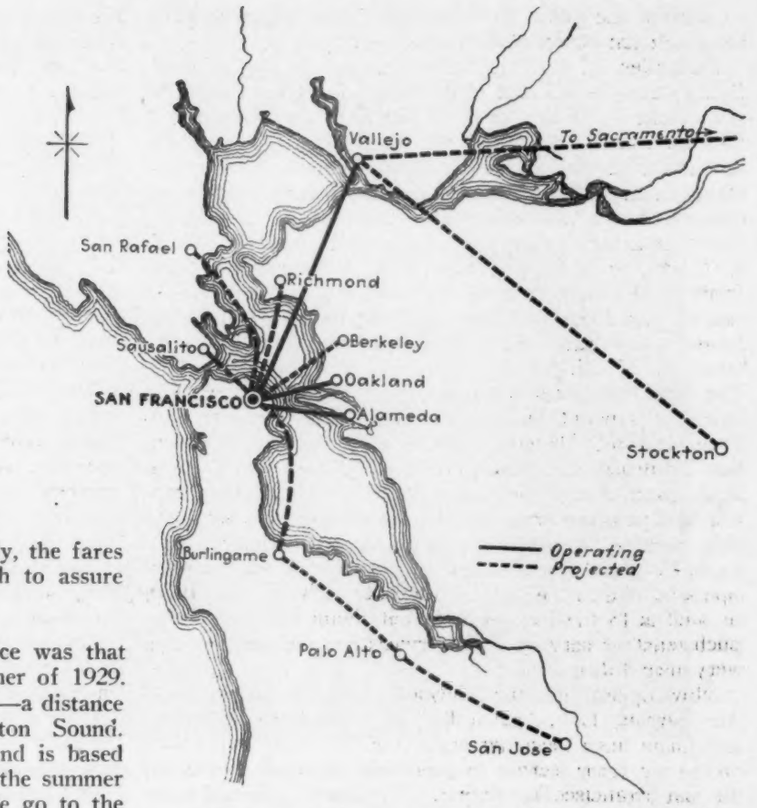
The first of these, Pacific Marine Airways, started operations between Los Angeles harbor and Catalina Island in the summer of 1922 using Curtiss flying boats operating across a 20-mile channel. This is said to have been the first regularly scheduled airline in the United States to operate consistently at a profit and is believed to be the oldest established commercial airline still in existence. Successful from the start, services over the Pacific Marine Airways route have been constantly expanded from year to year. This has been made possible by a tremendous volume of tourist traffic to Wrigley's "Magic Isle," and is an example of passenger air transport efficiently applied to a specialized field. Pacific Marine Airways was taken over by Western Air Express in June, 1928, and since that time the service has been further expanded by the addition of Keystone-Loening amphibion planes which have been flown direct from the Western Air Express terminal near Los Angeles, to Avalon harbor, Catalina, thus saving additional time for the vacationer. Boeing flying boats have been placed in service at Avalon for short trips around the island and to augment the all-water service across the channel. From Jan. 1 to Oct. 31, 1929, this line carried 8,845 passengers or an average of 30 per day. While traffic is quite seasonal over this route, reaching a high peak during the months of June, July, and August



The San Francisco terminal of Air Ferries, Ltd. Note slanting aprons

FERRIES

Has Established a Traffic of Service



Air Ferry Routes in the San Francisco Bay District

when the planes average 12 round trips daily, the fares charged, $10.00 each way, are high enough to assure profitable operations.

PROBABLY the first true "air ferry" service was that opened by Vern Gorst, during the summer of 1929. between Seattle and Bremerton, Washington—a distance of approximately 12 mi. across Bremerton Sound. Here, again, the service is quite seasonal and is based upon special local conditions in that during the summer months a large percentage of Seattle people go to the Bremerton resorts for the summer and thus greatly augment the number of workers who daily travel back and forth across the Sound. However, Gorst established his service with Keystone-Loening amphibions and carried 1,899 passengers in the first two weeks and 20,000 passengers in the first five months of the service. The trip, which required an hour and a quarter by boat consumed but 15 min. by air ferry. The price was $2.50 by air compared to $0.42 by boat. Gorst was the first to develop a float with ramps leading down into the water so that the planes could climb right up on the docks and discharge their passengers. The convenience and speed of this method of docking is far superior to any other and the novelty of it is a real asset to air ferry lines.

Gorst carried a considerable quantity of freight, newspapers, fresh vegetables, flowers, etc., in addition to passengers and found the service quite profitable and practical to operate. Although the traffic is seasonal, both on account of the summer colony situation outlined above, and because of the weather conditions during the winter, it is profitable to maintain operations practically the year around across Bremerton Sound and expansion of the service is planned for this summer.

Joseph J. Tynan, Jr., and his associates, deserve great credit for the vigorous manner in which they have established Air Ferries, Ltd., among the transport systems of the San Francisco Bay region. However, it was inevitable that such a service would be developed in that territory eventually because of the peculiarly favorable conditions facing the operator of air ferry planes. San Francisco is a city of remarkably equable climate, not subject to violent or prolonged periods of storm, and with but slight variations in temperature. Barring a certain amount of fog the San Francisco area may be considered very nearly ideal for the year around operation of aircraft.

From the transportation standpoint the San Francisco area is divided into three major territories by the San Francisco Bay, rendering water ferries the major means of transportation for a majority of San Francisco citizens. The San Francisco citizen who wishes to reach the Marin County residential area on the northwest side of the Bay, or the industrial-residential areas on the east side of the Bay must ride the ubiquitous ferry boat, an unquestioned boon to mankind but an inevitable stumbling block in the path of rapid transit. There are no tubes beneath or bridges above the Bay as yet, and despite much conversation it will probably be many years before there are such. In the meantime the Air Ferry offers a happy solution to the problem of rapid transportation for countless thousands of persons who find it necessary to travel in and around the San Francisco Bay region.

AIR FERRIES, LTD., started service, with three Keystone-Loening amphibions. Special floating docks were installed at the Oakland and San Francisco terminals in order to permit the planes to lower their wheels and run up the ramps to a dry loading platform. By actual timing of many hundred docking operations the actual time from the moment that the Loenings touched the water to the time that they had taxied to the dock, climbed up and discharged one full load of passengers, taken on another, rolled down into the water again and taken off, was found to be between two and three minutes. This is the secret of air ferry operation to the satisfaction of patrons, no time being wasted anywhere,

A further advantage of the ramp float is that it reduces the dock crew needed and makes it almost impossible

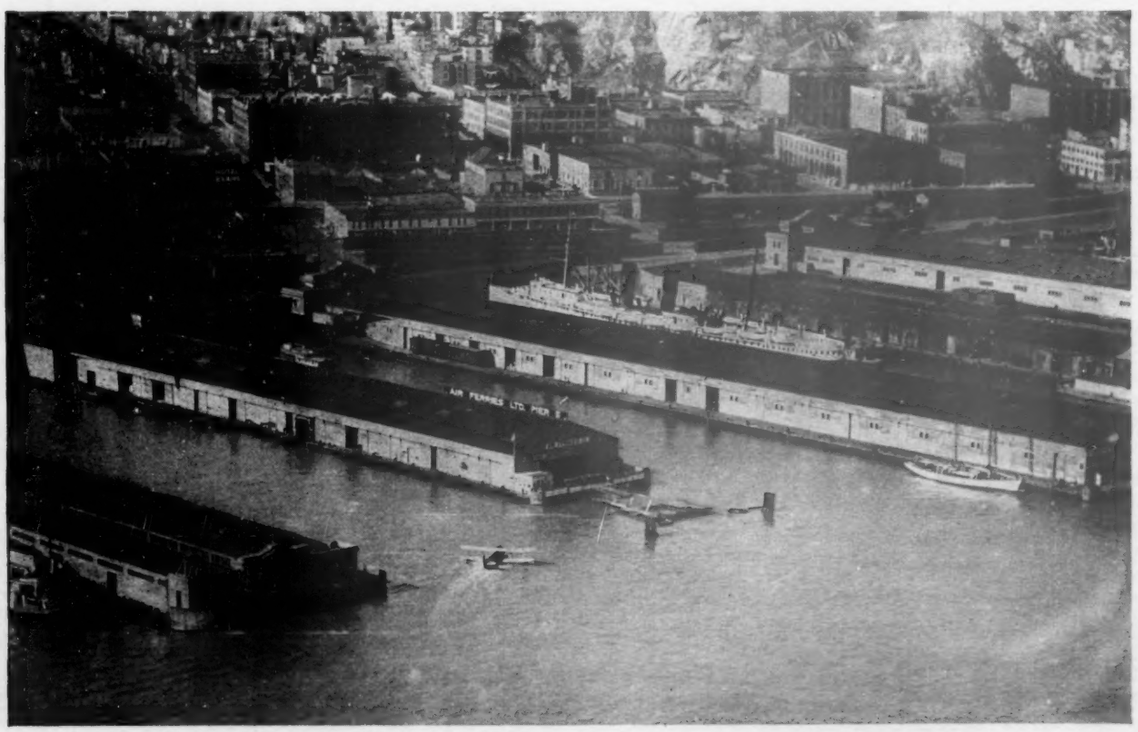
to damage the plane, as is so often done when ranging alongside the ordinary float, dock, or pier.

Schedules of the air ferry service on the original San Francisco-Oakland route called for trips every 20 min. from 7:50 a.m. until 11:50 a.m., and then every 15 min. from 12 noon to 6:00 p.m. This route proved so successful that a San Francisco-Vallejo service was inaugurated on March 27, the earliest date that sufficient equipment was available. The Vallejo run calls for a plane departure every hour from San Francisco from 8:05 a.m. to 5:05 p.m., and from Vallejo every hour from 8:30 a.m. to 5:30 p.m. Vallejo is at the northern end of San Francisco Bay, adjacent to the great Mare Island Navy Yard and a large industrial district, a distance of 22 mi. which is covered in 15 min. by air. The San Francisco-Oakland rún, a distance of but six miles, is covered in six minutes. Fare between San Francisco and Oakland is $1.50 each way and between San Francisco and Vallejo it is $3.50 each way. At a slight extra charge the planes flying on the Oakland run will land passengers at the Alameda or Oakland airports, thus making excellent connections with the various transport plane lines. Although no night service is now operated, due to the lack of adequate lighting equipment as well as to the lack of sufficient flying equipment for such constant service, such services are planned for the very near future.

Now operating four Keystone-Loening amphibions, Air Ferries, Ltd., has a fleet of four more on order and plans have been perfected for the rapid expansion of the air ferry service to cover all important towns of the San Francisco Bay region. Services are planned at an early date to the following points, at all of which docking arrangements have already been made since each of these towns is on the Bay or a large river: Sacramento, 89 mi. from San Francisco; Stockton, 82 mi.; Richmond, 9 mi.; and Sausalito, 6.5 mi. Another service is planned for the towns of Burlingame, Palo Alto, and San Jose, all south of San Francisco, with operations conducted from the San Francisco waterfront to land fields at each town named.

IN ORDER to be sure that the 11,378 passengers carried during the first 30 days of operation were no mere "joy-hoppers" out for the thrill of a single flight, Joseph J. Tynan, Jr., pres., arranged for a completed traffic check of all passengers carried during an average seven-day period after one month of service. The results showed that 71 per cent were traveling on business, that nearly 25 per cent had used the service before and were becoming "habitual" passengers, and that 23 per cent were using the air ferry in order to save time. While it is only natural that a large percentage of the early traffic over such a line should be of the curiosity seeker type, it is evident from the results of the questionnaire that much of the traffic is of a permanent and growing nature. Another significant fact is that during the first 60 days of operations 7,400 persons trusted themselves to air ferries who had never before been up in an airplane, thus demonstrating the confidence which the public has placed in this transport medium. The following percentages are the final averages for the seven-day period checked; Men—72.4 per cent; women—27.6; crossing bay on business—71.2; crossing bay on pleasure or social engagements—28.8; using air ferries to save time—23.1; using air ferries through curiosity—76.9; used air ferry before—24.7; making first airplane flight—40.2.

A consideration of the above figures makes it apparent that a goodly portion of the traffic now being carried may be classed as "legitimate customers"; persons who may be depended upon to patronize air ferries regularly. Some of the "legitimate" users already uncovered are: physicians making hurry calls; attorneys appearing in



An Air Ferries amphibion taxiing up to Pier 5, the San Francisco terminal of the line

A Keystone-Loening of Air Ferries Ltd. over the heart of the Oakland, Calif. business district

courts on both sides of the Bay on the same day, salesmen who value personal contact, messengers and buyers for large firms which maintain branches in several of the Bay cities, ship captains who berth at Oakland but fly to San Francisco and back in order to arrange their papers and make it possible to weigh anchor a full hour earlier, and in general, of course, all persons who are in more of a hurry than usual. Since more than 110,000 people cross the Bay every day by water ferries it is evident that the air ferries have a vast traffic reservoir on which to draw. The best traffic record for Air Ferries thus far has been the carrying of 947 passengers on Sunday, Feb. 16.

COMMUTATION BOOKS are soon to be issued as a step toward building genuine commuter patronage. A further service planned is the handling of parcels in conjunction with established agencies. Already two San Francisco newspapers are sending their early issues and extra editions across the bay on the air ferry planes in order to get them on the streets of other Bay towns while the front-page headlines are still "hot off the press." Several hospitals have used the air ferries to rush special serums across the Bay by messenger and this practice will no doubt become more and more common. A further factor which assures the permanency of an air ferry service in the San Francisco bay region is the happy manner in which it ties in with all rail, bus, and air lines operating north, east, or south from the Bay district. Passengers on Boeing, Western Air Express, T.A.T.-Maddux Air Lines, West Coast Air Transport, and Pacific Air Transport can save time both going and coming by patronizing Air Ferries. Transcontinental train travelers can cut approximately two hours from their journey by transferring to the Air Ferries plane at Vallejo. Other services soon to be inaugurated will effect particularly advantageous connections with a number of important bus lines.

With a normal average of 74 landings a day it is natural that there are many problems of operations technique to be faced. Air Ferries planes are based at the Oakland Airport, where a complete mechanical staff and shop is constantly engaged in inspecting and conditioning the planes in order that the rigid daily schedules shall not be interrupted. Naturally this requires that practically all mechanical work be done at night in order that the daytime flying may continue. Needless to say, the abnormal number of landings and takeoffs with full loads is a constant drain on both planes and engines and calls for extreme care in servicing. Landing areas are always calm at Oakland, Alameda, and Vallejo, but the San Francisco waterfront becomes fairly rough at times and subjects the planes to real punishment. Because of the short route it is the practice to carry a small load of fuel, thus making it practicable to carry a full load of seven passengers. This practice calls for refueling on about every third round trip, the time spent in refueling also being used to advantage for the draining of any water which normal leakage may have allowed to seep into the hull, thus keeping the hull as light as possible at all times for greater efficiency. Although numerous ferry boats, river boats, and ocean steamers are constantly plying the waters of San Francisco Bay the water areas are so wide and the traffic is such a well-regulated and normal occurrence that no inconvenience has ever resulted. One danger is carefully watched and that is the presence of floating logs or timbers in the water areas near the docks. Fast speed boats are provided with which to run down and pick up such obstructions and the dock crews, as well as the plane pilots, watch the water areas closely. These speed boats are also always available in case an emergency should arise requiring the rapid transfer of

passengers from the planes at some distance from the dock, or in the event of a motor failure requiring that the plane be towed to the dock.

Wharf terminals are merely pier ends equipped with small offices such as any shipping company might use, with a fenced-off portion to separate spectators from passengers. Docks were originally large floats with floating ramps on three sides up which the planes could taxi while the passengers mounted the runway to the pier on the fourth side of the float. New floats of special design have now been built and installed. These are of large, unit, cantilever construction, the ramps being a rigid portion of the entire float structure and extending well down into the water below the level of the plane's wheels when approaching. Such a float makes it much easier for the amphibions to climb the ramps under their own power. Incidentally, dock crews are completely equipped with gaff hooks, gangplanks, etc., in case of engine failure while a plane is in the act of climbing the ramp. Two men can hold the plane on the ramp in such an emergency while the passengers are landed and a new load taken on via the emergency gangplank. In the meantime the pilot re-starts the engine and is ready to go without delay and with but slight inconvenience to passengers.

As outlined above, Air Ferries, Ltd., is expanding its service rapidly, based upon the overwhelming acceptance which has been accorded its early operations. By midsummer of 1930 this company expects to have a fleet of 20 amphibions in regular service between a total of at least a dozen central California cities and towns.

There are already 13 pilots regularly flying for Air Ferries, the largest active flying force permanently

Climbing ramp with full load—seven passengers and two pilots

stationed in the San Francisco Bay district. These men include a number of nationally known aviators. Samuel Metzgar is chief of operations, H. A. Reed, assistant chief of operations, while Charles McHenry Pond, Lieut. Charles G. Shone, Bartlett Stephens, Monty Sharp, Ray H. Varney, Jerry Andrews, Ray Moore, Francis Sawyer, George McCallum, Vic Hoganson, Leo Biegger, Fred Hammer, and James Hennessey complete the pilot group. A number of these men have had wide experience flying with the Vern Gorst air ferry service at Seattle.

Officers of the company include Joseph J. Tynan, Jr., president; L. G. Mathews, assistant to the president; and Marshall Hale, Harry S. Scott, Harrison S. Robinson, James Rolph III, Ted Huggins, Vern C. Gorst and Courtney L. Moore, directors.

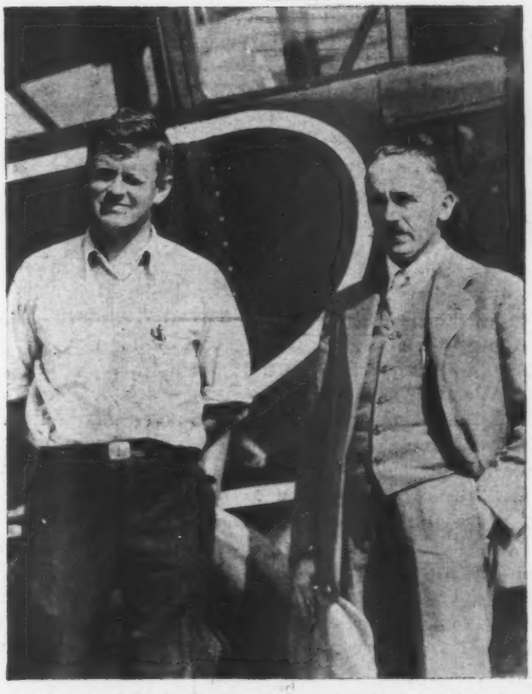
Although, as has been outlined above, San Francisco was a particularly fertile field for the development of such a service as the air ferry, nevertheless it seems reasonable to believe that what the air ferries are doing for transportation in the San Francisco Bay region, they can do in some degree for at least 20 other American cities. In general it will be necessary for all such services to take advantage of water areas near the business district for landings, and some such docking as has been worked out by Air Ferries, Ltd., seems to be the solution to the problem where a close schedule is being maintained. However, it will probably prove practicable to operate air ferry services at many points which will not justify the volume of traffic or frequency of schedules which has characterized the San Francisco operation. Many population centers where large numbers of people travel some distance between work and home, or to yacht clubs, golf grounds, or hunting clubs, will find the air ferry, even on an intermittent schedule, a valuable service once established.

IN GENERAL it seems quite probable that the real possibilities inherent to short-haul air passenger carrying have been somewhat slighted. A check of traffic figures reveals that approximately 300 times as many people ride inter-urban transit systems every day as ride the longer cross-country routes, and that approximately 1,000 times as many ride on downtown rapid-transit systems as ride the cross-country lines. While we cannot hope to place airplanes in a sort of around-town taxicab service, we should look forward to the time when a considerable portion of our populace will ride back and forth from home to work via air in preference to surface travel. Such a development will come first with the amphibion, and later with all types of planes. It will extend the radius of any one man's action, make it possible for him to work and play at greater distances from his home, and just as each succeedingly more rapid form of transportation has enriched us by freeing our everyday lives from limitations of space and distance, so the arrival of an era of short-haul rapid transit by air will possibly vastly improve our whole economic structure and see the airplane come into its own as a medium of transportation.

Certainly such a prospect seems to be sufficiently promising to both hope and work for at the present time. It may be that we will find it possible to design planes ideally suited to short-haul service which will hasten the arrival of such an era. Designing for comparatively low speeds, the ability to lift heavy loads, unusually rugged landing gears, the elimination of much of the fuel load carried on longer flights, and the development of specialized docks and landing fields may give us ferry and taxi plane services much sooner and on a wider scale than many have heretofore dreamed would be possible. Traffic studies of interurban bus and rail lines of many American cities show 18 m.p.h. to be a good over-all average speed for the routes covered. Such a figure is a direct challenge to the aviation industry and it is to be hoped that the success of Air Ferries, Ltd., in their San Francisco Bay operations, will be a direct and immediate inspiration to the establishment of many more short-haul air services in this country.

MAKING *Aerial Mapping* PAY

By MAJ. H. A. ERICKSON
President, Erickson Flying Photographer, Ltd.



Left to right, F. G. Powell, pilot, and Maj. H. A. Erickson, photographer, standing by their Fairchild Cabin monoplane

AERIAL PHOTOGRAPHY has advanced rapidly in methods during the last few years owing to improvements in equipment and the fine advance made in design of planes and engines. In the early days we were limited to pusher type planes and later to the Jns with open cockpits. Now the aerial mapper can be comfortable in an enclosed cabin plane.

In the air a decade ago it was difficult to obtain enough altitude to carry on a photographic mission. How high we could go and how long we could retain an adequate altitude were two vital questions each time we started out for a photographic flight. Nearly two-thirds of our flying time was consumed in climbing to the desired elevation, which hardly ever exceeded five or six thousand feet. Today our elevation is not so limited and with the aid of oxygen mapping is being done at relatively high elevations, sometimes 18,000 ft. or more.

Elevation of a mapping run generally is determined by the elevation of the ground, particularly in the west where ground levels may range in a short distance from sea level to 14,000 ft.; and it sometimes is necessary to be as much as 12,000 ft. above the ground elevation. With the present larger power plants and planes of increased load carrying capacity, however, altitude is reached in a short time. Moreover it may be maintained for several hours without returning to the ground for fuel.

Today photographic mapping may be done hundreds of miles from the base and with planes of high cruising speed considerable time may be saved in covering the area. Recently we flew for seven major oil companies in California a job which required flight lines each of which was 75 miles long. Here we flew from 500 to 750 miles daily. More of this will be discussed later, but I cite the case here to indicate the necessity of having not only a powerful engine, but a dependable engine and plane of good characteristics. We employed a Wasp-powered Fairchild.

Development of photographic equipment has kept pace with engine and aircraft development. Where 10 years ago we operated with plate cameras capable of handling possibly 48 plates during a single flight, now the cameras used for mapping employ roll film on which 100 or more exposures may be made. We can make an unlimited number of exposures on a single run, operating as long as light will permit. It is easy indeed to make 800 exposures on a single mapping flight.

Equipment has advanced to such an extent that either in the field or in the laboratory the film can be handled immediately and prints made from it in a short time. We develop our film (100 exposures to a roll)

Commercial aerial photography is a business in which many have become engaged, but relatively few have been successful. Among the first to attempt this sort of work was Maj. H. A. Erickson. His success needs no comment here, for it is well known throughout flying circles. ¶*In the accompanying article Major Erickson writes of the various problems that confront the aerial photographer, and of the methods that he follows so that his work will meet with the complete satisfaction of his clients.*

by the Stineman system which has been adopted by the U. S. Army and Navy and was used in the recent Alaska aerial survey by the Navy.

Films can be made ready for printing within one hour after developing has started. The system of printing the film on the roll without cutting the exposures also expedites the process. In filing, also, the film remains in its original roll, requires less space and is more easily classified. Enlarging is also handled on the roll and corrections are made for so-called "tilt."

The mosaic work with the advanced equipment, beginning from the plane and power plant to the finished print, may be done rapidly. The photographs are easily made at a true vertical and at the desired elevation and require very little enlarging or reduction of the prints. Also in copying mosaics we have devised a camera which will use cut film or glass plate up to 30x40 in. in size. Again this camera is utilized to enlarge these negatives in order to get the reproduction back to the original scale.

The definition in the reproduction is remarkable. No detail is lost and one could easily believe the finished reproduction to be really the original picture.

OF COURSE, all this equipment costs considerable money but it also expedites the work. We find usually that our clients want speed in production. For instance, they will call us up on Monday informing us that they want a certain area surveyed. We immediately fly to "headquarters" to get their maps showing areas desired, and by Tuesday evening, if the area is not very large, we are back at our home base ready to develop the film. On Wednesday the prints and mosaics are made and copies reproduced and on Thursday morning our clients have the finished job in their office. Speed of production and quantity of the finished work makes the impression which brings us the volume of our business.

Speed in completing the job and delivering the finished work together with a necessarily uniform quality, was partly responsible also for bringing to our offices the largest oil mapping job yet attempted in the west. It became necessary first to attract a number of companies who were interested in the same general area by proving to them not only the economy but also the value of having a map of the entire district. As a result, through the efforts of Mel. S. Kennedy, in charge of aerial survey for the Texas Company, eight oil companies became associated in a survey of 2,200 sq. miles in four counties adjacent to Salinas.

The companies participating were the Texas Company, the Shell Company, Continental Oil Company, General Petroleum Corporation, Associated Oil Company, Union Oil Company, Richfield Oil Company and the Western Gulf Oil Company.

When we began to undertake this large job, we determined that our product, the finished pictures and the finished mosaics, would be more accurate and show better detail if we made all operations as nearly mechanical as possible. At the outset, to guarantee uniform altitude we purchased a new Paulin altimeter, the first altimeter of this type to be used commercially. We installed a centigrade thermometer on the strut in such a position that it could be read from the cockpit. We also were furnished with a computator by which we were able to determine the difference between actual elevation and elevation as indicated by the altimeter.

Before taking off, a note was made of the thermometer reading, and on reaching the desired elevation as registered by the altimeter, we again read the thermometer. Thus, our temperature on the ground may have registered 64 deg. and the temperature at the mapping altitude 32 deg. We then adjusted the computator and determined the true elevation. The Paulin altimeter would then be set at the actual elevation as desired for flying. By checking the reading hourly and noting any change in temperature, we were able to maintain constant elevation above the ground.

Naturally contours on the ground beneath showed a difference of 700 to 5,800 ft. above sea level, and if we were 12,000 ft. above the ground level it naturally was necessary to make exact readings to determine elevation. Fortunately we had a plane and engine sufficiently efficient and powerful to carry us rapidly above changes in contour below. The area also was so large that if climatic conditions at one side did not permit flying we could move easily to the other side and continue our work successfully.

From our base at the Salinas American Legion airport we flew 75 hr. 10 min., of which 63 hr. 50 min. were used in the survey proper. An average of 33 sq. miles was mapped per hour of flying. We made 3,486 exposures during 18 days of flying, delivering 30,969 prints in addition to mosaics to the various companies. Prints were made in 16 days, an average of 2,000 prints

The Wasp powered Fairchild Cabin monoplane used by Major Erickson on his aerial survey of oil lands

per day. The job was completed in 10 weeks. Two K-5 aerial cameras were used. As the flying strips were 75 miles long it became difficult at times to see even half the length of strips. For this reason we carried a navigator along. Irving Frazier, an engineer with the Texas Company, served in this capacity, and his application of United States Geological Survey sheets used for flight control was excellent.

Since our flight lines were so long we were forced to use two cameras. At our elevation, 12,000 ft. above the ground level, one camera would photograph approximately 54 miles on one roll of film which was 75 ft. long, and on which 100 exposures were made. As film was used up in No. 1 camera, No. 2 camera would be

Pilot Powell and Major Erickson holding the Fairchild K5 cameras used on the survey

put in place and operations continued on to the end of the flight. On reaching the end of a flight line and while the pilot was maneuvering to get on his next line for the run back, the camera with the exposed film was reloaded and ready by the time the flight was started.

These flights were flown back and forth but they were so long only four to six runs could be made in a single day. Fortunately we had perfect weather and in the time we were in the field only one day was lost, due to cloudy weather.

Each night we dispatched to the laboratory at San Diego, 500 miles distant, those rolls exposed during the day's work. In this manner we were able to develop as the job progressed and in case any faulty film were discovered we could fly that part of the area again and thus avoid a long and expensive—both in time and money—flight at some later date.

As the contract called for a delivery of prints of the areas in which the various companies were interested, 32,544 sheets of paper were used, of which 30,969 were delivered. The percentage of waste was only .045 per cent. This success in perfect printing was due largely to the use of the new Eastman 11x14 printers in conjunction with the Pakodoper developing machine and the Gang Rocker system for fixing and washing. Also the drying was taken care of by use of the large double belt driers. It required only 16 days to make and deliver this large number of prints. A few weeks later the mosaics were delivered.

While the average interval between pictures was about 16 sec., sometimes intervals between exposures was only 7 sec., especially when we were flying with a strong tail wind. A 60 per cent overlap was contracted for and true verticals were required. Throughout the job these requirements were met. Not a single picture was out of true vertical and the average integral was maintained throughout with or against the wind.

This area had not been surveyed for oil geology from the air and through Mr. Kennedy the various companies interested were combined to finance the survey. Advantages to them are manifest. The pictures individually are utilized by the various companies by their field crews and by oil geologists.

The photographer who undertakes to do a really good job of aerial mapping must contend with a number of things, especially if he hopes to please several discriminating masters. First, the flying. The capabilities of the pilot, the power of the engine and cruising range of the plane are the principal necessities for good flying. If the pilot cannot fly in a straight line considerable retakes result. If the plane cannot reach the necessary ceiling the photographer has considerable more photographic work to do. These things are axiomatic.

THE MAPPING photographer depends for his success in a large measure on his pilot, and good photographic pilots are few and far between. The good photographic pilot has become successful through hundreds of hours of photographic flying. It may seem easy to the average pilot to go up with a photographer for "a few pictures," but after each flight he learns new angles about the game and soon realizes that the more he flies the less he knows. The pilot satisfactory to the painstaking and expert aerial cameraman must be able to fly by his instruments, especially at high elevations. In making air maps the pilot must fly an absolutely level and straight line over the area that the photographer may make parallel strips to tie in with previous and future runs across the charted ground. By doing this he obtains the necessary overlap.

In any branch of air photography, the pilot should be experienced in photography. Manifestly his task becomes easier and he becomes more expert with experience. The pilot continues to be responsible in large measure for the success of the photographer, especially for map making. I never use a pilot who has had less than 500 hrs. flying time. For an hour or longer, on the larger mapping jobs, the pilot must be able to keep his course without vertical or horizontal deviation regardless of air conditions. F. G. Powell, pilot for the General Petroleum Corporation, who served as my pilot while mapping these areas, could not have flown six parallel strips at an altitude of 12,000 ft., each 75 miles long, had he not had adequate prior experience. The cost is too great to rely on an inexperienced pilot. If the developed film shows misses in the area, the photographer must fly again and help the pilot pick out those spots in the area for new pictures at the same altitude as previously flown.

One of the things generally overlooked by a company in estimating the cost of aerial survey is the cost of flying. One may think that $1,000 will pay for a certain job, but our experience has demonstrated that it is better to estimate the cost at three times that figure to be sure of coming well within the cost. Next is the film cost, and naturally if there are a number of retakes much more film will be used and the cost of film is a considerable part of the total cost.

As far as the laboratory work is concerned, we find that the best available equipment is cheapest in the long run. Good equipment cuts down the time and help elements. If the laboratory is operated as nearly mechanically as possible, quality of production is more uniform and satisfactory.

THE CURTISS Condor

Transport Plane Powered With Geared Conqueror Engine is Commercial Conversion of Military Machine

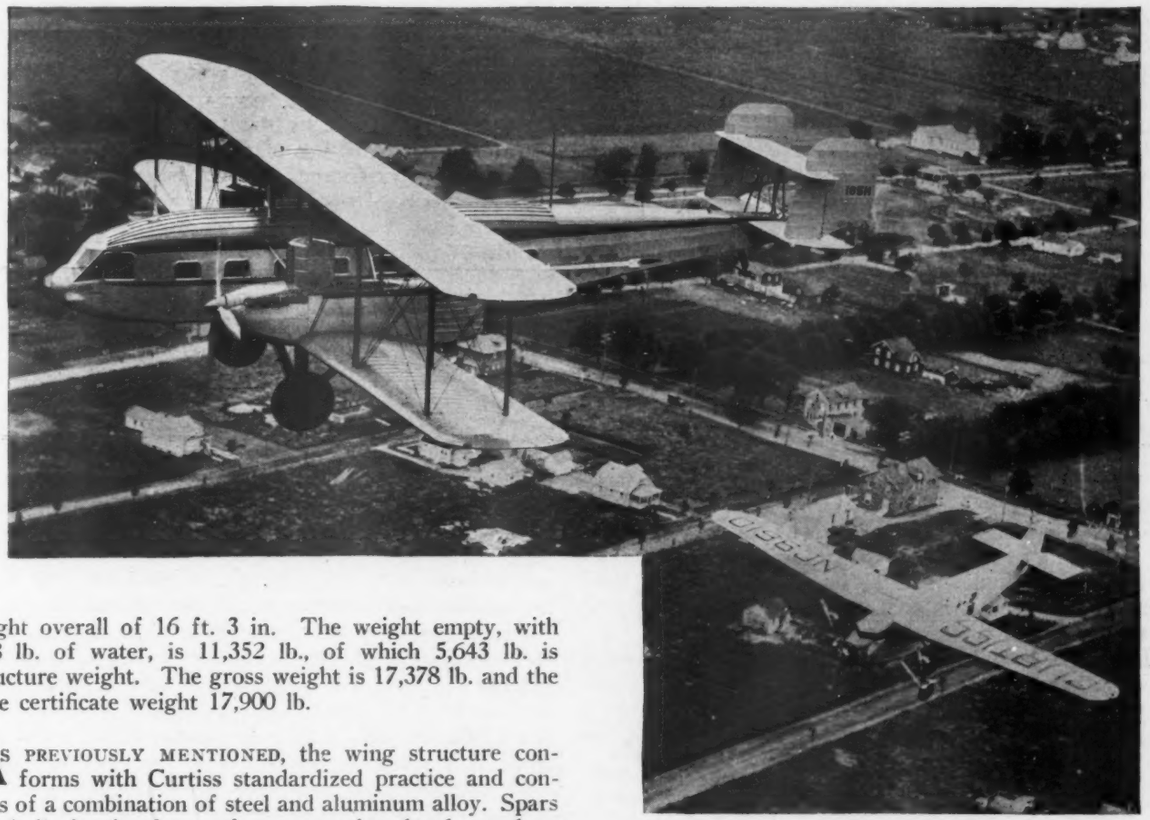
By LESLIE E. NEVILLE
Technical Editor of AVIATION

THE CURTISS Condor Transport, several of which are in daily operation in the service of T.A.T., is a commercial conversion of the Condor B-20 Bomber. Following a redesign of the military craft, the first commercial Condor was test flown during the Summer of 1929 and shortly afterward placed in T.A.T. service. Several minor modifications have been made in the past few months, mainly with the object of increasing visibility for passengers, and the resulting model is now in production at the Garden City plant of the Curtiss-Wright Corp.

From the standpoint of Curtiss structural practice the Condor might be considered as conventional, except for its size. Aerodynamically it is unusual because of the fact that it is a biplane, whereas all but one of the other American transport machines at present available are monoplanes. It is also exceptional in that it is probably the only American transport at present powered with water cooled engines, and that it is a twin-engined rather than a three-engine land plane. The power plant consists essentially of Curtiss Geared Conqueror engines rated 600 hp. each at 2,400 r.p.m. Credit for the design is due mainly to T. P. Wright, chief engineer; George Page; and Alexander Noble, project engineer.

EXCEPTING the interior arrangement, the Condor Transport bears a marked resemblance to its military prototype. Engines are mounted in nacelles on the upper surface of the lower wing and as close as possible to the fuselage structure with provision for adequate propeller clearance. Radiators are mounted above the nacelle and behind the engine with appropriately streamlined housings and shutter arrangements. The Condor has a wing span of 91 ft. 8 in., length overall of 57 ft. 6 in. and

A Curtiss Condor taking off. Note the position of the engine nacelle and interplane radiator



Curtiss Condor and Ford tri-engine airplane, representing equipment used by Transcontinental Air Transport

height overall of 16 ft. 3 in. The weight empty, with 288 lb. of water, is 11,352 lb., of which 5,643 lb. is structure weight. The gross weight is 17,378 lb. and the type certificate weight 17,900 lb.

AS PREVIOUSLY MENTIONED, the wing structure conforms with Curtiss standardized practice and consists of a combination of steel and aluminum alloy. Spars are built in the form of a truss, the chord members being steel tubes drawn to elliptical section, and the web members round steel tubes. Chrome molybdenum steel is used throughout the highly stressed portions of the structure. Chord members of the spar are heat treated in lengths to a tensile strength of 140,000 lb. per sq.in., while normalizing provides sufficient strength for the web members. In the welding process the heat is closely confined to the point of junction and does not affect the middle third of the span sections where stresses are high. The web members that are in tension pass entirely through the chord members, while the others are welded to the inner surface of the chord members.

Ribs are made up of flanged tube drawn sections of aluminum alloy, while webs are of tubular section with flattened ends riveted to the flanged tube cap strips It is interesting here to call attention to the characteristic Curtiss method of attaching the ribs to the spars. A small sheet steel lug, approximately equal in length to the major axis of the elliptical section of the chord member, is welded transversely to the chord member at two points. This forms a flat surface to which the flanges of the rib caps may be riveted with two rivets. The leading edge is sheathed with aluminum alloy sheet, while the wing tips are formed of tubular members of the same material. Drag bracing is of standardized Curtiss type. Fabric covering is employed for the entire wing and plywood walkways are provided for the lower wing center section between the fuselage and the engine nacelles.

Wings are of rectangular plan form and constant thickness employing the familiar Curtiss C-72 airfoil section. The chord of each wing is 108 in. and the gap 126 in. Both wings are set at an angle of incidence of 1.5 deg. The upper wing dihedral is zero and the lower wing dihedral 3 deg., while the sweepback of both wings is zero and the stagger in inches at the leading edge is also zero. The total wing area is 1,510 sq.ft., of which 238 sq.ft. constitutes the aileron area. High incidence load factor is 4.5. At full load the center of gravity is located at 32.7 per cent of the mean aerodynamic chord. Ailerons are constructed in a manner somewhat similar to the wing and an angular travel of 25 deg. upward and 25 deg. downward is provided.

The fuselage also conforms with the general structural practice of the Curtiss Co. and embodies a combination of chrome molybdenum steel and aluminum alloy. Longerons are of 2-in. steel tubing through the main stations and represent the greatest diameter of any tube employed in the fuselage structure, while the intermediate truss members are of aluminum alloy riveted to aluminum alloy clamps wrapped around the longerons. Tubular rivets are used and applied cold. In order to avoid passing of fuselage members through window areas, the familiar "K" bracing is used through the cabin section, while a conventional Warren truss is employed in the tail. The arched metal roof is built up of .020 aluminum alloy, while the cloth covering the fuselage sides is pressed into the edges of the roofing material to provide anchorage in the covering process. Flooring is built up of wide channel members of aluminum alloy riveted together at right angles to each other.

The metal structure of the plane is protected externally through the use of red oxide primer and paint. Open tubes are painted inside and all sealed tubes are treated internally with linseed oil. Cadmium plating is employed for steel fittings and the aluminum tubes used in the cooling system are anodically treated.

Cabin walls are lined with dry zero blanket, the space between inner and outer walls being approximately 3 in., and a crash linen material is employed on the interior for the individual compartments. Partitions, interior trim, and certain other portions of the inside wall are finished with Formica paneling. The main cabin is 6 ft. wide and has a maximum head room of 6 ft. 8 in. There are three general passenger compartments, each of which is intended to accommodate six passengers, and in the latest production model the lavatory compartment is located approximately in the center of the useful portion of structure on the starboard side. This modification has been made because of the blind spot that formerly existed at that point and effects a great improvement in the visibility of the three passenger compartments. With the same object in view the engines were moved forward 29 in. from the original position and the length of the nacelles reduced 42 in. at the rear.

In addition to the change in nacelle length and position of engines, several other minor modifications have been made to increase visibility for passengers. The area of the windows has been increased and the windows themselves lowered 1 and 1½ in., while the seats have been raised 1 in. An arched window has been placed in the after part of the rear compartment.

Lavatory compartment equipment follows the general practice employed in Pullman cars and a 5-gal. water supply tank is provided. Flare releasing mechanism is also located in this compartment and controlled from the pilot's cockpit.

EMERGENCY DOORS are provided in the subdivisions other than the entrance compartment and the layout is such that there is a window beside each set of seats. Double seats are on the starboard side and single seats on the port side with an aisle between running the length of the cabin. The lavatory compartment is in the third subdivision from the rear and occupies the starboard half of the subdivision, the remainder being devoted to aisle space and a long seat which may be used as a couch or to seat three or four persons. Special nonshatterable glass is used throughout and the window area in the passenger cabin has been reduced to a minimum to aid in the solution of the soundproofing problem.

Although no definite provisions have been made to convert the plane into a night transport, the length of each compartment is 7 ft., which is slightly more than that of the standard Pullman berth, and it would be a comparatively easy matter to install sleeping berths in the airplane if service conditions required them. The capacity of the entire passenger cabin is about 865 cu.ft.

One of the outstanding features of the Curtiss Condor is its heating and ventilating system. The airplane is heated by steam obtained from a plant especially developed for aircraft use by the Foster Verney Co. The plant does not make use of the cooling water employed in the Conqueror engine, as might be expected, but consists essentially of two units, one for each engine, deriving their heat from small boilers attached to the exhaust manifolds and each employing but 6 oz. of water which is not consumed in the heat producing process. Steam thus produced is led through tubes to the radiators in the various compartments and controlled by shutoff valves at each radiator. The weight of each of the two heating units is approximately 12 lb. Ventilators are of conventional type and placed at various intervals in the roof of the cabin and pilot's compartment. Another feature contributing to the comfort of passengers is the specially designed chair employed in the Condor. The chairs are built of aluminum with backs tapering to padded head rests and upholstered in leather. A wide range of back adjustments is possible and the locking and releasing device is conveniently placed so that it can be reached by the hand when adjustment is desired.

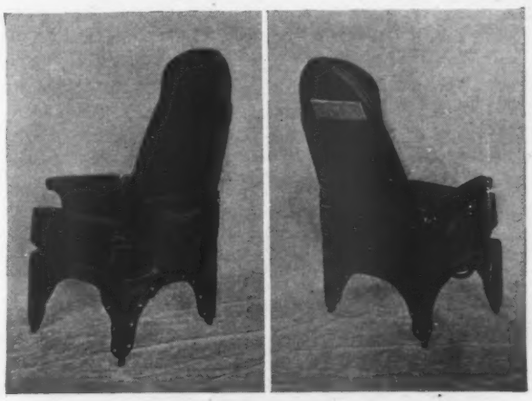
An interesting development in airplane lighting is the specially designed fitting to provide reading light for each passenger. This was adopted following a study of the problem by Mrs. Frank H. Russell, stylist for the Curtiss Company, and the result is not only attractive and practical, but is quite satisfactory from the designer's standpoint because of the almost negligible weight of the shade units. The light unit consists of a small metal fixture flush with the wall and covered with a square parchment shade folded at the sides and fitting over the light bulb. This shade is decorated with a simple conventional design. Each compartment has a ceiling dome.

The pilot's cockpit, being located in the nose of the plane, has the advantage of high visibility conditions. In some of the Condors already produced stained amber glass has been used in the upper panels for eye protection. Side windows are raised by means of cranks and an arch is provided in the top of the compartment. Flare release controls are behind the pilot and the stabilizer control wheel is behind and to the right of the left hand seat. The compass is located behind the pilot and read through a mirror. Manual control is provided for the radiator shutters.

Flexible cables are used for the most part in the control system in conjunction with chains and sprockets, and control cables are electrically bonded at each end and

Front quarter view of the Condor showing its size in comparison with the two men standing under the nose

at the center. Ball bearings are employed in the engine control. A useful device in the control system is the rudder compensator which is actuated by a knurled knob which regulates the tension on the shock cord so placed as to relieve the pressure on one foot resulting from flying with either engine throttled down. Buffet and



The specially designed adjustable back seats used in the Curtiss Condor

radio compartments are located in the section between the cabin and the pilot's cockpit.

Control wires run through two channels between the floor beams and a metal cover is provided for these channels and is readily removable for inspection.

Radio equipment installed by the Radio Corp. of America consists of combination telephone and telegraph transmitter deriving its power from a dynamotor which draws its current from the landing light batteries. Entire equipment for sending and receiving weighs but 145 lb. and was developed by the Radiomarine Corp. of America to use a remote control system of trailing wire antenna.

Careful attention has been paid to the electric wiring in the Condor and all lines are run through ducts and amply fused, the fuses being accessible to the assistant or co-pilot. All ignition cables are, of course, shielded.

The Condor has a biplane tail with double rudders, each one being in the slipstream of one of the engines. The angle of travel of the rudder is plus and minus 25 deg., while that of the elevators is 28 deg. up and 20 deg. down. Stabilizers are adjustable through a range of 8 deg. The area of the elevators is 47.6 sq.ft., while that of the rudders is 63 sq.ft. The total horizontal tail surface area is 144.9 sq.ft. and that of the vertical tail surface is 76.6 sq.ft.

The usual form of three-member landing gear having a 20 ft. 4 in. tread is employed, the material used being chrome molybdenum steel. Shock absorbers are of special design, embodying the use of a combination of oleo and steel spring. A total of 14 in. of deflection, 9 of which is due to oleo, is provided. 54x12 in. Bendix wheels and brakes are used, while experimentation is under way to determine the most desirable type of tail wheel. An 18x5 in. solid rubber tire has been used while experiments have also been conducted on the pneumatic type. A full 360 deg. castor action is provided for the tail wheel.

In an effort to keep gasoline out of the cabin, a remote fuel control system has been incorporated in the power plant. Three main fuel tanks are used; one in each nacelle having a capacity of 192 gal., and a 62 gal. emergency tank in the upper wing. Outlets from these tanks are controlled by three valves located under the floor beams and fuselage, and having appropriate strainers and shut-offs controlled by chains and sprockets running from valves to the pilot's compartment. Engines are started from the gravity tank, while gasoline from the nacelle tanks is pumped from the tanks by an engine driven fuel pump. The system of cross feeding is such that, if one pump fails, the other will supply sufficient fuel for both engines. Two large dump valves are provided.

As PREVIOUSLY MENTIONED, the engines are Geared Conqueror models with a 2:1 gear ratio and 13 ft. diameter, three-blade Curtiss Reid "R" type metal propellers are used, the normal pitch setting being 23.4 deg. at 42 in. station.

Engine nacelles are structurally similar to the fuselage. The covering, however, is .016 aluminum alloy sheet. Each nacelle, in addition to a baggage compartment and gasoline tank, has a compartment to accommodate a storage battery.

Two 12-volt Exide batteries are used in conjunction with two engine driven generators and Eclipse starter. The system furnishes all of the lighting, radio and ignition current for the plane, as well as current for two landing lights streamlined into the lower portion of the nose of the plane.

Flash fire extinguishers are used throughout the plane and consist of carbon dioxide cylinders placed at appropriate positions in the engine nacelles and cabin, the units in the nacelles being controlled from the cockpit.

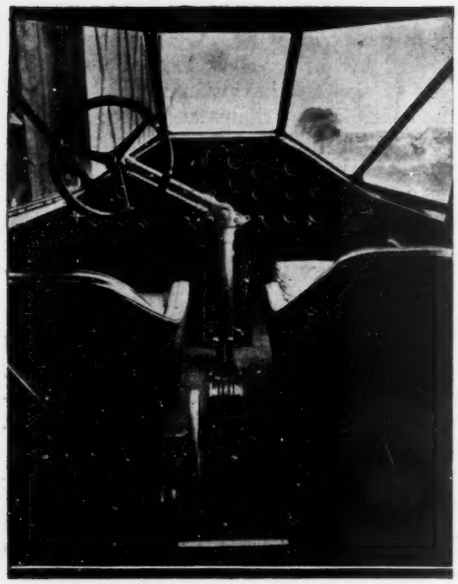
Length Overall	57 ft. 6 in.
Height Overall	16 ft. 3 in.
Span Overall	91 ft. 8 in.
Chord Up	108 in.
Chord Lo.	108 in.
Mean Aerodyn. Chord	108 in.
Gap	126 in.
Stagger at L. E.	0
Incidence Up	1.5 deg.
Incidence Lo.	1.5 deg.
Dihedral Up	0
Dihedral Lo.	3 deg.
Sweepback Up	0
Sweepback Lo.	0
C. G. to Rud. Hinge	440 in.
C. G. to Elev. Hinge	440 in.
Wing Loading	11.52 lb. per sq.ft.
Power Loading	13.55 lb.per hp.
Airfoil Section	C-72
Load Factor H. I.	4.5
C. G.—%M.A.C. (Full Load)	32.7
Engines	Two Geared Conquerors
Hp.	1,200 at 2,490 r.p.m.
Propeller	Curtiss Reid "R" type 3 blade
Propeller Diameters	13 ft.
Propeller Pitch	23.4 deg. at 42 In. station
Cooling System Type	Interplane Radiators
Weight, empty with 288 lb. Water	11,352 lb.
Structure	5,643 lb.
Power Plant	3,564 lb.
Fixed Equipment	2,145 lb.
Useful Load	6,026 lb.
Crew	510 lb.
Fuel and Oil	1,916 lb.
Pay Load	3,600 lb.
Gross Weight	17,378 lb.
Type of Certificate Weight	17,900 lb.

Areas

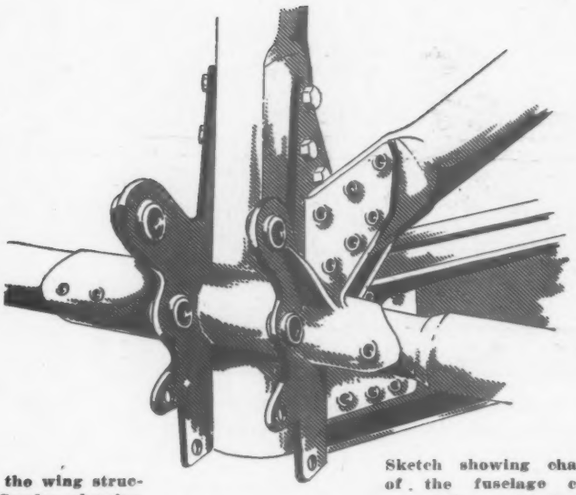
Wing Incl. Ailerons	1,510 sq.ft.
Ailerons	238 sq.ft.
Horiz. Tail	144.9 sq.ft.
Vertical Tail	76.6 sq.ft.
Elevators	47.6 sq.ft.
Rudders	53.0 sq.ft.

DESIGN FEATURES OF

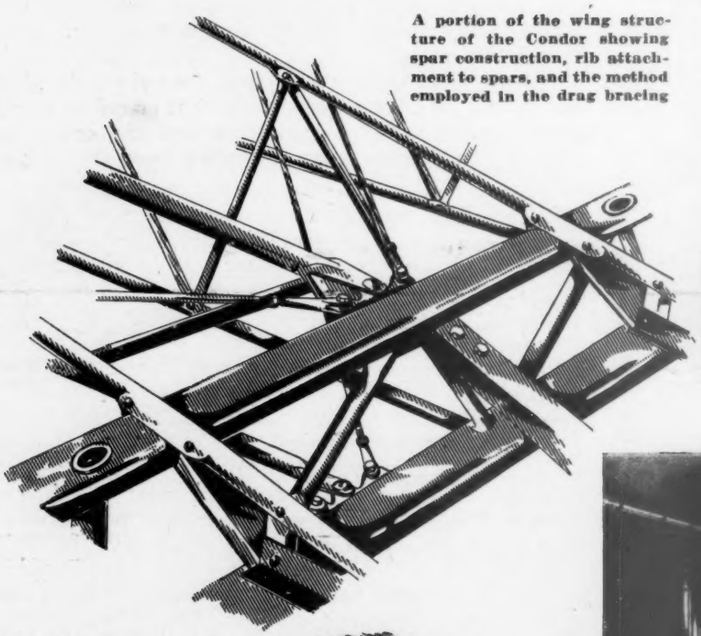
Curtiss "C



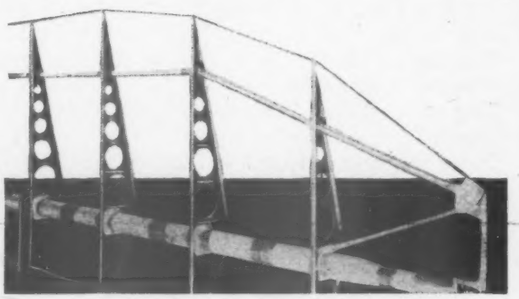
The pilot's compartment of the Curtiss Condor. Stabilizer wheel and fire extinguisher controls are shown in the foreground



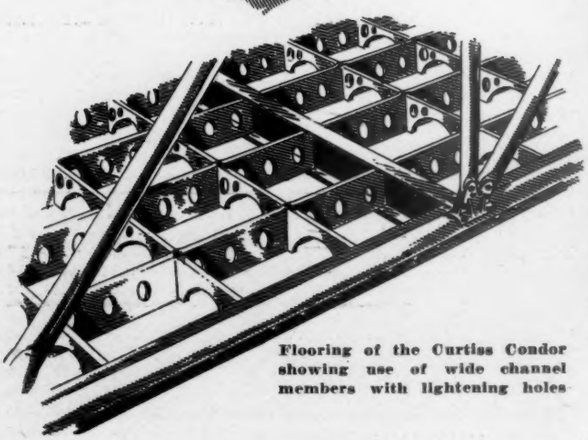
Sketch showing characteristics of the fuselage construction at fitting attachment point



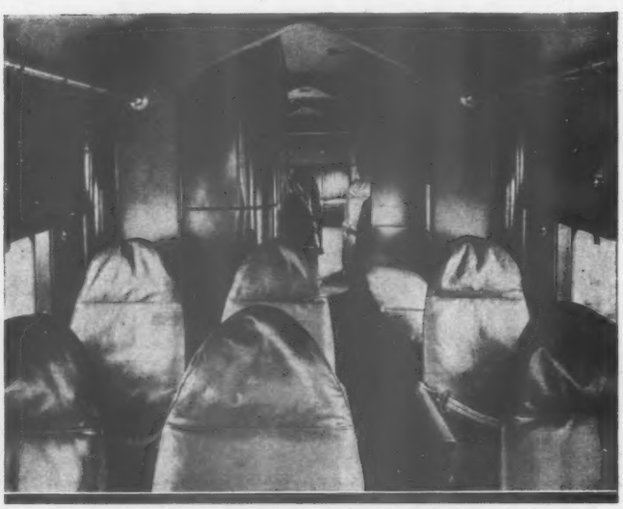
A portion of the wing structure of the Condor showing spar construction, rib attachment to spars, and the method employed in the drag bracing



Construction details of the Condor aileron

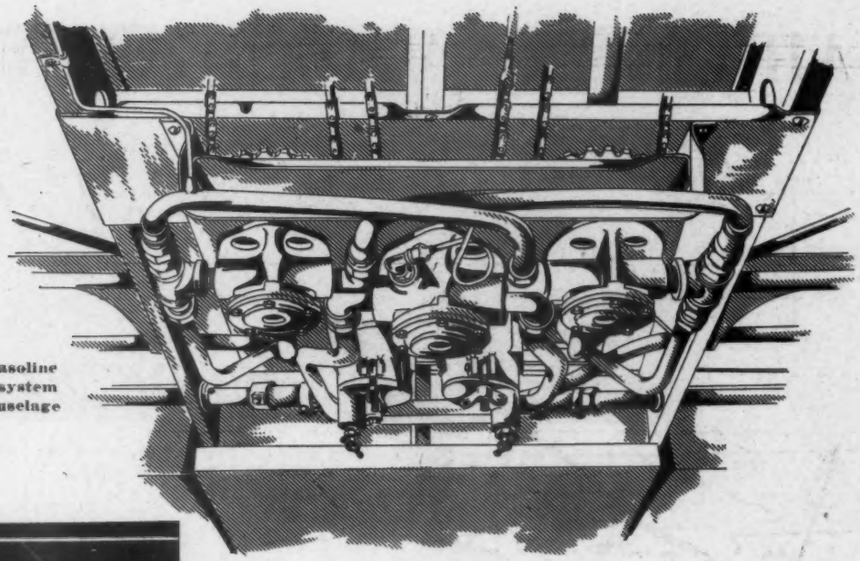


Flooring of the Curtiss Condor showing use of wide channel members with lightening holes

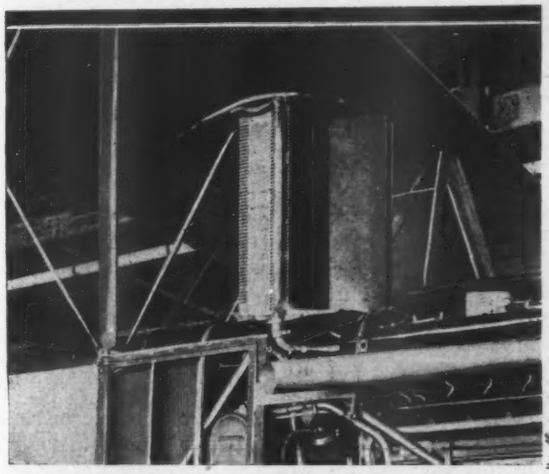


Interior view looking rearward showing modifications in layout to produce greater visibility. The lavatory compartment is shown at left center while the subdivision in the foreground is the forward passenger compartment. The metal housings in the corners of the compartment are part of the heating system

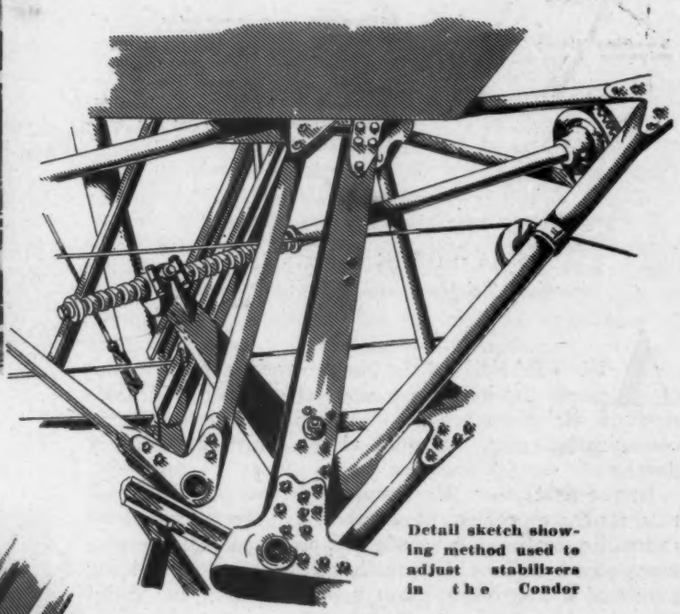
THE *"Condor"*



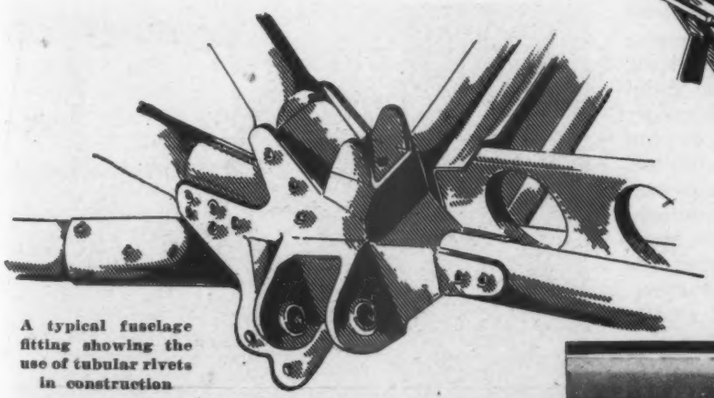
The remotely controlled gasoline valves used in the fuel system sketched from beneath the fuselage



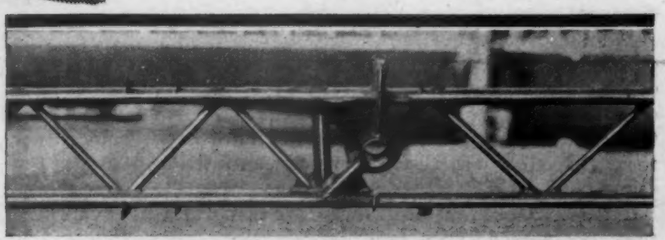
A close up of one of the interplane radiators with the cowling removed to show shutter action



Detail sketch showing method used to adjust stabilizers in the Condor



A typical fuselage fitting showing the use of tubular rivets in construction



A portion of the wing spar showing the steel lugs for rib attachment and the method of passing tension members through the chords of the spar

AIRLINE COMMUNICATION BY *Telephone Typewriter Service*

A Description of the Equipment

Map drawing of the Eastern Air Transport line served by telephone typewriter

By GEORGE G. BREED
American Telephone and Telegraph Company

AIR TRANSPORT, like railroad operation, depends for its success upon the proper co-ordination of its several units. For many reasons, this co-ordination must be much closer, much more finely developed.

In the first place, air transport shares with the railroad its early problem of weather. In the beginning of railroad operation the weather played a part, the importance of which is seldom realized. Rain, snow and fog exercised a controlling effect upon schedules, and it did not take much *weather*, of the wrong sort, to seriously cripple operations. Since *weather* is the very element in which the airplane operates, its importance to this new form of transportation is manifestly much greater.

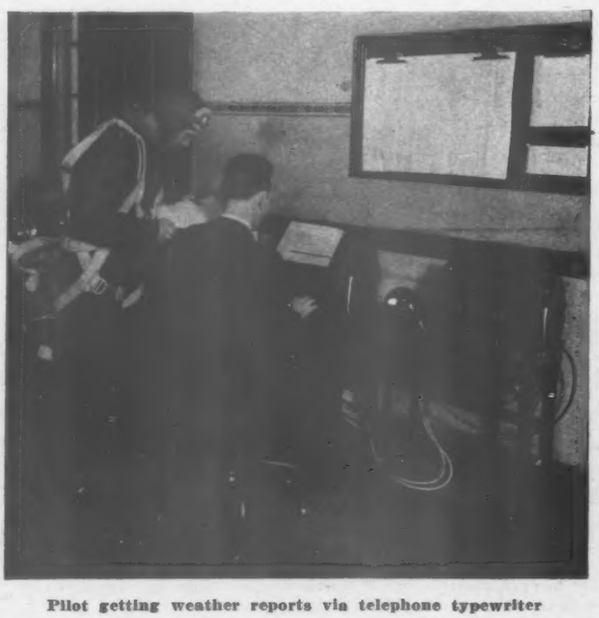
Air transport is at a disadvantage beside the railroad in that its development is a matter of a very few years instead of decades. It has not that wealth of experience upon which the railway industry can draw. Further, it is dealing with much higher speeds and greater distances.

All these considerations necessitate a high degree of co-ordination. To achieve this the widely scattered units of the air transport company must have channels of communication that are rapid, flexible and convenient; that permit a degree of co-operative effort approaching that achieved where all units are concentrated at a single point.

Eastern Air Transport, Inc., formerly Pitcairn Aviation, operates a daily mail service along the Atlantic coast from New York to Florida. Connecting with major air routes from the North and West, it handles an important part of the country's fast mail. The company makes every effort to maintain an operating speed of 100 m.p.h. —involving an actual flying speed of over 110 m.p.h.

This is a new mark to aim at in transportation. The railroad is operating on a schedule involving speeds—for fast passenger trains—of 40 to 50 m.p.h. To achieve the results necessary where a speed twice this is being maintained, an air transport company must have instantaneous and continuous contact between its various units. Only in this way can the work of plane-dispatching be carried on efficiently and the many activities of the company be properly co-ordinated.

To establish this contact, Eastern Air Transport, Inc.,



Pilot getting weather reports via telephone typewriter

An exhibit demonstrating the use of telephone typewriter service placed in the New York Show by the New York Telephone Company

Which Permits Instantaneous Communication Between All Stations

installed a telephone typewriter service along its New York-Atlanta run.

The telephone typewriter is in the nature of an electric typewriter operating over Bell System telephone lines. It is similar to the ordinary typewriter and is operated in the same way—words typed on one machine being reproduced simultaneously on one or more machines which may be next door or, as in the case of the Eastern Air Transport service, scattered along a 1,600 mile line.

THE THEORY of operation of the machine is illustrated on page 1137. The sending and receiving mechanisms are driven by governed motors running at approximately the same speed. When the typist depresses a letter key on the keyboard of the sending apparatus, the key lever strikes the slanting sides of the notches in the five selector bars and moves them either to the left or right depending on the code for the key depressed. The total number of possible combinations is 32 which allows one combination for each letter and additional ones to control certain machine functions such as shifting to print upper case characters, unshifting, spacing, etc. In this diagram the first and third bars are shown displaced to the right putting the corresponding contacts in such a position that they can be closed when the cam rotates while the other contacts are left in a position which prevents their closing. This combination corresponds to the letter "S."

At the same time that the key lever strikes the selector bars, it also moves the universal bar down releasing a latch and allowing the sending cam shaft to rotate.

The contact lever labeled "6" controls the starting and stopping of the receiving mechanism. When no signal is being sent the receiving magnet is held operated but when the sending cam shaft starts to rotate the sixth contact opens, the receiving magnet armature is released and the rod for starting the selector cam clutch acts through intermediate devices not shown to release a stop arm and permit the five selector cams (only one of which is shown) of the receiving printer to rotate.

The first contact lever of the sending mechanism then rides on the surface of its cam and drops into the indent thereby closing its contact and sending a closed circuit impulse over the line. The second contact in the combination shown will not close and the line circuit will be held open. As the cam shaft rotates further the impulses either open or closed, are transmitted in succession, while a locking device not shown in the diagram prevents any change in the selection set up until the revolution has been completed and the signals transmitted.

When the selector cam of the receiving mechanism shown in the diagram rotates sufficiently it strikes the end of the code bar operating lever. By this time the armature is again operated because the first impulse is coming over the line and we have assumed it to be a closed impulse. The armature and armature extension will then occupy the position shown in the figure. As the cam passes its code bar operating lever, the latter is rotated slightly in a counter-clockwise direction carrying back with it the sword, the right-hand end of which will strike the right-hand end of the armature extension. The sword will be rotated clockwise in its pivot and when the cam projection moves to clear the operating lever, the sword will move against the left end of the "T" lever in its motion forward and move the code bar to the right.

In the case of an open circuit impulse, such as the second impulse, the magnet armature and the armature extension will be in their unoperated positions. The No. 2 sword, not shown but directly beneath No. 1 sword, when pulled back by the action of the selector cam rotating the code bar operating lever, will strike the left end of the armature extension which is bent down at each end so as to be common for all five swords. The No. 2 sword will then be moved counter-clockwise so as to engage the right end of the "T" lever and move the No. 2 code bar to its non-selected position. In this manner each of the five code bars in succession is made to occupy either a selected or non-selected position determined by the code for the particular character to be printed.

The five code bars are slotted to correspond to the signaling code. For each operation of the printer the

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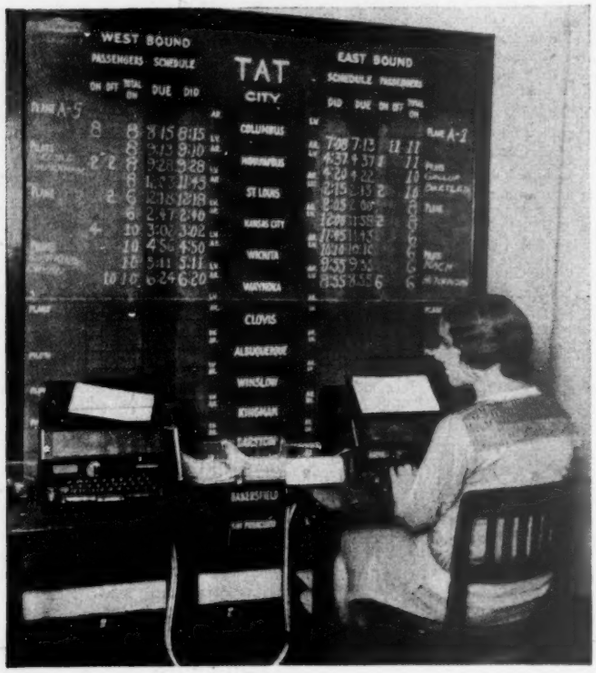
pull bars for all the type-bars and printer functions are permitted to move into contact with the edges of the code bars. In front of one of these pull bars (the one to be operated) there will be a "line-up" of slots in the code bars, permitting this pull bar to move further forward. All the other pull bars will be restrained by striking an unslotted portion of one or more of the code bars. Thus one and only one pull bar of the group will be selected and because of its additional forward movement the printed bail in its upward movement will engage the notch of this pull bar and cause the letter to be printed or the special printer function to be performed.



Telephone typewriter equipment installed in a T.A.T.-Maddux station

Just as the telephone is a medium for oral conversation, telephone typewriter service is a medium for written conversation. In the case of the Eastern Air Transport it is a long "party line," one on which every station, from the general offices in Brooklyn to the airport at Atlanta, can at any time send or receive. The other stations on the circuit are at Newark, Hadley Field, Camden, N. J., Baltimore, Washington, Richmond, Greensboro, N. C., and Spartanburg, S. C.

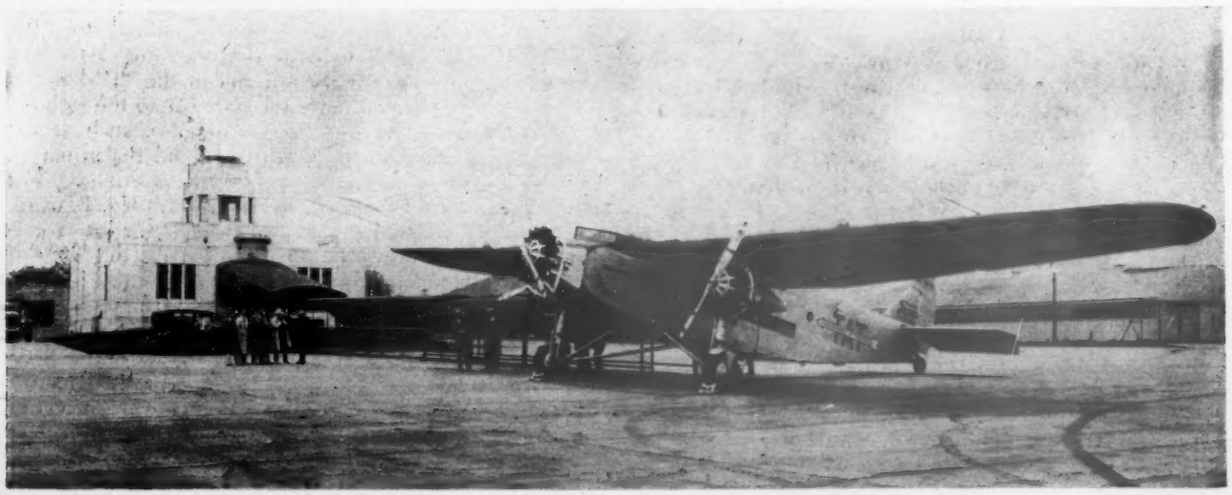
When a plane takes off from Hadley Field, full information regarding it is typed out on the line. This includes the number of the plane and direction of flight, designation for the particular division it is flying, the name of its pilot, the time of departure, the number of pouches and weight of mail. News of its arrival or departure at each airport is likewise sent out over the line. This is acknowledged by two stations ahead and one station behind the plane.

When there is any change in the daily schedule of operation, notice is at once given to the other stations. Such changes are principally due, of course, either to weather conditions or to delay in other air mail services with which the company connects. The immediate transmission of such information greatly facilitates operations, enabling other stations along the line to rearrange their plans in a way that will make most efficient use of equipment available and expedite handling of the mails.

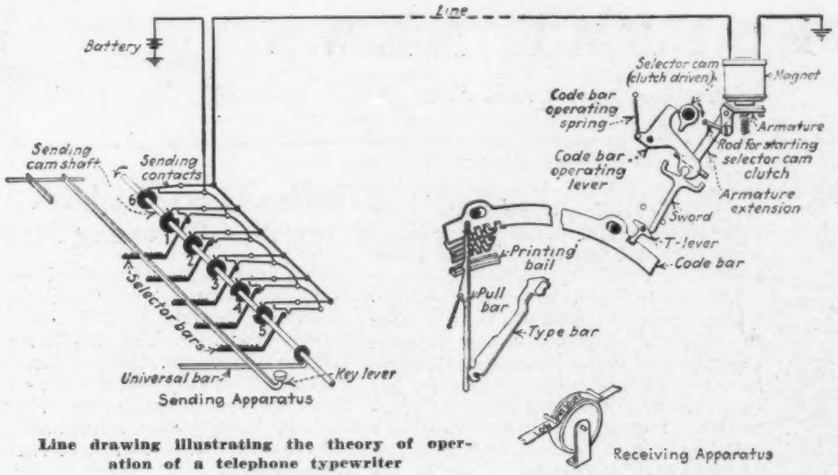
Where, for example, the plane is held at Camden by weather which shows little inclination to improve, the representatives at points south will probably decide to "train" the mail on hand. It may be overtaken and picked up further south by the plane when it finally gets away. Or instead of training it, the company may order another plane at one of those points to take off with it. In any case no time is lost. The point is that every field manager is in almost as close touch with the pilot and headquarters as if all operations were being conducted on the roof of the Brooklyn building.

The circuit is also used for the transmission of weather information, supplementing a similar service furnished by the Department of Commerce. "Get me Richmond weather," says the company representative at Bolling Field, Washington, and a few minutes later the southbound pilot has full information on conditions at Richmond—"Wind north five miles, overcast ceiling one thousand feet, etc."

The company also runs a "shuttle" mail service between New York and Washington, on some occasions,



A Wasp powered Ford tri-engine transport used on the T.A.T.-Maddux line



Line drawing illustrating the theory of operation of a telephone typewriter

using several planes to handle the mail on this run. Just before a plane takes off on this trip, weather data are collected by telephone typewriter from all stations. Thus, with the information furnished at scheduled times by the Department of Commerce and the supplementary report sent over his own circuit, the pilot has up-to-the-minute information on conditions over the whole area to be traversed. Where conditions are changing rapidly a complete new report is available at each stop.

A WIDE RANGE of other matters is handled by the company's telephone typewriter. A prospect wants to fly from Camden to Mexico City. What should the rate be? What equipment, what pilot should be used? Can a pay load be picked up for the return trip? These and many other questions could be decided by the field manager, but with the general office in such close touch with every unit of the company, it is at once able to decide it in a way that will insure satisfactory service and maximum operating efficiency.

The service is also used by the company's executives for conferences—and at the conclusion of the conversation each conferee has verbatim "minutes" on the tape of the machine.

One important use of the service is in the handling of supplies and spare parts, general supply headquarters being at Richmond. Through the close contact between it and the other points along the airway, material can be quickly moved. In the case of some of the fields, outside sources of aircraft supplies are not very close at hand, and in a service that must move on schedule and make the most efficient use of every ship, the "nearness" of Richmond is a tremendous advantage.

Another important use of the telephone typewriter circuit is in the exchange of accounting data. While regular reports are handled by mail, there are many details in which a rapid channel of communication such as this can expedite the handling of them.

There are, of course, other potential uses to which the service will undoubtedly be put from time to time. In the case of a plane forced down, the pilot has only to get in touch with the nearest station and he is in touch with all of them. As a result, every unit of the company can be mobilized to handle the emergency. The nearest field can send out for pilot and plane, Richmond can find out at once what spares are needed to repair the plane and ship them, and the main office can rearrange operations in a way that will involve the least delay of mail service.

TELEPHONE typewriter service is constantly finding wider use in connection with airways. It was first applied by the Department of Commerce, which established a circuit along the New York-Cleveland Airway for the exchange of meteorological data between the various fields. In co-operation with the Weather Bureau the Department of Commerce soon developed a weather-reporting system that provided every flier along the route, whether on the ground or in the air, with complete data on weather conditions at every airfield. A frequent schedule made these reports of the greatest value.

This reporting system consisted, briefly, of an interchange of information over the telephone typewriter circuit between the various points on the airway and the transmission by radio telephone to planes in flight by Department of Commerce radio stations so located that their ranges of audibility overlapped.

In consequence of the success of this system, the Department has since established similar networks elsewhere throughout the country. From Oakland, Calif., one circuit runs south to San Diego and another north to Portland. A third telephone typewriter system stretches eastward to Cheyenne, Wyo.

From Chicago westward another Department of Commerce circuit runs through Des Moines, Omaha and St. Joseph to Kansas City, Mo. Along the Atlantic seaboard the Department has recently established a telephone typewriter line from Boston to Richmond.

As in the case of the New York-Cleveland airway, these circuits provide a channel of communication between radio stations, airports and weather reporting stations along a route, permitting a rapid exchange of meteorological information for the benefit of pilots at the various airports and, through the radio, of planes aloft.

Telephone typewriter service is also used by T.A.T.-Maddux Airlines along the aerial sections of its air-rail transcontinental line. One circuit parallels the airway from Columbus, Ohio, to Waynoka, Okla., and another runs along the airway from Clovis, N. M., to Los Angeles. The company also uses service along its airway on the Pacific Coast.

In addition to providing for a quick interchange of weather reports, the service is used for plane dispatching, for making reservations for passengers at intermediate points and for all manner of administrative matters.

In the development of air transport activities the interchange of information has proved to be a problem of first importance. A change in the weather, a sudden opportunity to pick up a pay load en route, perhaps on a plane "deadheading" it over the airway, are both developments of vital interest to the pilot, the operations manager and the various airport managers. News of such developments, often originating in an unexpected place at an unexpected time, can only be disseminated by means of a communication system that is flexible, simple in operation and reliable.

GENERAL NEWS

HERBERT F. POWELL, *News Editor*

Graf Arrives At Lakehurst

Flies Here From Brazil With Twenty Passengers

LAKEHURST (N. J.)—Having covered more than 13,000 mi. in 204 hr. of actual flying time, the Graf Zeppelin arrived here on its Pan-American flight, May 31, at 7:25 a.m., and through the efforts of a comparatively small ground force using the mobile stub mooring mast was soon berthed in the hangar. Lieut. W. E. Zimmerman had charge of the landing personnel.

The dirigible, under command of Dr. Hugo Eckener, brought twenty passengers—ten of whom will return to Europe aboard the ship—and a crew of 42. Among the other 12 persons who will be added to the passenger complement for the craft's seventh trans-Atlantic crossing will be Sir Hubert and Lady Wilkins, and Frederick M. Harpham, vice-president of the Goodyear Zeppelin Corp., at Akron, Ohio. Commander Eckener has invited two enlisted men from the crew of the "Los Angeles" to fly to Friedrichshafen. The two chosen are W. A. Russell, chief machinists' mate, and F. L. Peckham, chief boatswains' mate.

Capt. Harry E. Shoemaker, who was recently ordered to Germany to return on the Graf as official U. S. Navy observer, tells of seeing three rings laid at the Zeppelin works for a craft which will probably be as large in bulk as the Navy ships now being built at Akron.

Havana Stop Skipped

While at Lakehurst the ship will take on 800,000 cu.ft. of fuel gas, composed of two parts pyrofax and one part hydrogen, and about 425,000 cu.ft. of hydrogen for lifting purposes. The servicing is being done by Lieut. Comdr. J. C. Arnold and engineers from the Carbide and Carbon Chemicals Corp., which provided gas for the craft at other refueling points.

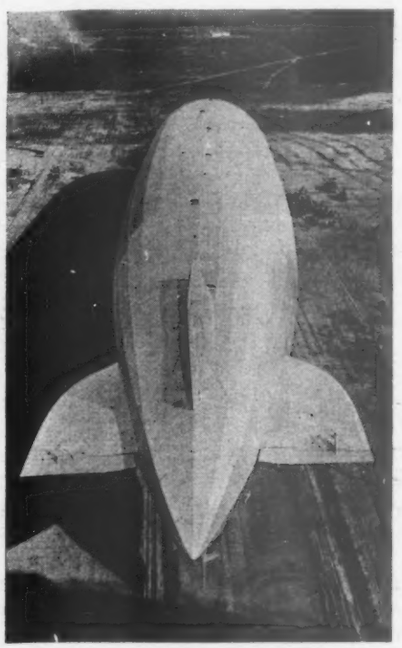
As heavy rains at Pernambuco, Brazil, so weighted down the dirigible that about 8,820 lb. of the fuel consignment there could not be taken on, Commander Eckener did not stop at Havana, Cuba, fearing that the reduced supply would be inadequate if bad weather was encountered after leaving there.

As it was, however, a 30-hr. supply remained in the tanks when the Graf reached Lakehurst.

Squalls, characterized by Dr. Eckener as the worst he ever experienced, hit the ship just north of Bermuda, a 30-mi. tailwind suddenly switching to a 45-m.p.h. headwind. During this period struts, holding one of the aft engine gondolas, which had been damaged and temporarily repaired at Pernambuco, became loosened, but this condition is being rectified by mechanics at Lakehurst.

The trip to South America was undertaken, stated Dr. Eckener, to determine the ship's airworthiness under extreme conditions of air and heat, and results have proved that a dirigible service between the two Americas would be practicable. Heavy wind and rainstorms befalling the Graf between Rio de Janeiro and Pernambuco caused no harm, it was asserted.

It is expected the Zeppelin's visit to Lakehurst will have cost nearly $25,000 when all accounts, including the Navy Department's $2,000 a day hangaring charge and $3,000 for preparing the base are totaled. Fuel is an item.



Viewed from the top of the hangar—the Graf Zeppelin being backed into the Lakehurst quarters after the journey from Brazil

A mail cargo, estimated to be worth $150,000 at the special rates prevailing, was taken from the ship. Of this amount, Luftschiffbau Zeppelin, the company owning the Graf, is to receive $100,000 from the Post Office Department.

It is understood that Dr. Eckener is conferring with possible promoters of trans-Atlantic airship lines concerning the furtherance of plans for such routes before returning to Germany.

The log of the latest trip of the Graf, which is nearing its one-hundred thousandth mile after more than sixty long and short flights, is as follows:

Sunday, May 18
12:18 p.m. — Left Friedrichshafen, Germany.

Monday, May 19
1:40 p.m.—Arrived Seville, Spain.

Tuesday, May 20
4:30 a.m.—Left Seville for Pernambuco, Brazil.

Thursday, May 22
7:05 p.m.—Landed at Pernambuco.

Friday, May 23
10:52 p.m.—Left Pernambuco for Rio de Janeiro.

Sunday, May 25
6:30 a.m.—Landed at Rio de Janeiro.
7:42 a.m.—Left on return voyage to Pernambuco.

Monday, May 26
8:10 a.m.—Arrived at Pernambuco.

Wednesday, May 28
10:30 a.m.—Departed for Lakehurst.

Saturday, May 31
7:25 a.m.—Landed at Lakehurst.

(The times given are Eastern Daylight Saving.)

Italian Fliers Establish New Non-Refueling Mark

NEW YORK (N. Y.)—Word received from Italy tells of a new non-refueling endurance record of 67 hr. 15 min., achieved by Maj. Umberto Maddalena and co-pilot Lieut. Fausto Cecconi on June 2. This exceeds by 1 hr. 49 min. the former world mark of 65 hr. 26 min., made by Pilots Johann Risticz and Hans Zimmerman, the Germans, in 1928, flying a Junkers.

The Italian fliers used a Savoia monoplane, Model S64B1S, designed by Alessandro Marchetti at the plant in Sesto Calende, in their successful venture. The craft, similar to the one in which Capt. Arturo Ferrarin and the late Maj. Carlo del Prete made their Italy-to-Brazil trip in 1928, was powered by a 550 hp. Fiat.

Beginning the flight at 5.31 a.m. Friday morning, the airmen flew over a course between Montecelio, Ostia, Ladispoli, and Anzio, coming down at Montecelio Airport, 12:46 a.m., Monday.

Major Maddalena, who participated in the rescue of Gen. Umberto Nobile and his party in Spitzbergen two years ago, is said to be planning a non-stop flight to the Panama Canal this summer.

Midland Oil Purchases Moths

ST. LOUIS (MO.) — Three Moth biplanes have been sold by the Curtiss-Robertson Airplane Manufacturing Co. to the Midland Oil Co., of Fort Worth, Tex., to be used for carrying payrolls and tools into the oil fields.

S.A.E. Considers Fuel System Design

FRENCH LICK (IND.)—The summer session of the Society of Automotive Engineers, held here, included an aeronautical session on May 28. Arthur Nutt, Chief Engineer of the Motor Division of the Curtiss-Wright Corp., spoke on aircraft engine installation, and Dr. O. C. Bridgeman and Hobart S. White of the Bureau of Standards on "The Effect of Airplane Fuel Line Design on Vapor Lock." Another paper on vapor lock, also of aeronautical interest, was presented at one of the general research sessions.

As in several of his past discussions of similar topics, Mr. Nutt dwelt especially upon the need of better coöperation between the airplane and engine designer. He particularly criticised fuel and lubricating systems and engine mountings and recommended greater care in installing a rigid attachment of power plant supports to the fuselage. Engine controls also came in for serious criticism on the ground of fragility and complexity, as did the design of cowlings.

Fuel Line Constriction Discussed

Mr. Nutt mentioned vapor lock as one of the problems that could be largely avoided by proper installation and especially stressed the necessity of bringing the overflow lines from the discharge side of the pump back to the source of supply, instead of merely bypassing back to the intake side. Dr. Bridgeman and Mr. Aldrich also remarked on the great differences in vapor lock tendencies and in the freedom of fuel flow that may be introduced by small changes in the type of the fuel line. Thus it was found in one case that a constriction just at the outlet from the tank permitted a flow only half that when the same constriction was introduced in the pipe midway of its length. Constrictions obviously produced vapor lock tendencies as a result of the turbulent flow that they caused; for in one case a reduction of 25 per cent in the fuel pressure reduced the flow through a constricted pipe by 60 per cent, while a straight pipe showed a loss of flow of only 7 per cent with the same pressure change. The general conclusion from this work and from practical experience is that vapor lock in fuel lines can be a very serious problem, but that it can be largely overcome for any conventional type of aviation fuel now used by careful layout of the fuel system.

N-B Forms Glider Division

MARSHALL (MO.) — Immediate delivery of an order for complete knockdown parts for 50 Gliders to the Northrup Aircraft Co., Minneapolis, has been announced by the Nicholas-Beazley Airplane Co., this city. A special glider division has been organized by the local company for the building of these parts.

R-100 Canada Flight Delayed

MONTREAL (QUE.)—Though damage sustained by the R-100 on a recent trial flight in England is considered slight, the lack of immediate means to repair the injury may cause postponement of the trip to Canada until early next month, word received here states. It is said material to replace the 30 ft. of fabric torn off the tail fin will be heavier, while intermediate girders will be added for strengthening purposes.

Engine Exports Up; Fewer Craft Shipped

WASHINGTON (D. C.)—A decrease in aeronautical exports in the classifications other than engines is noted for April, according to figures of the Department of Commerce.

Twenty-nine engines, valued at $109,324, were shipped out during that month, as compared with 19, valued at $98,958, during March. The mark for April was approximately $30,000 less than that for April, 1929. Contrasting the four months ending with April, the 1929 period shows the exportation of 125 engines appraised at $624,140. During the same length of time in 1930, 86 engines were exported worth $364,985.

Shipments of aircraft during April, 1929, were appreciably less than during March, eighteen planes valued at $288,603, leaving the country during April, as compared with 27 planes, representing $425,688, during March. Twenty-eight planes for $537,526 were exported during April, 1929. However, a comparison of the four-month periods shows that although the number of machines exported this year have dropped from 97 to 74, the aggregate valuation has risen from $1,174,305 to $1,641,046.

Aircraft parts and accessories exported, except tires, show an increase in value during the four-month period. In the first third of 1929 an appraisal of $656,552 was recorded, as contrasted with that of $660,908 during the corresponding time in 1930. April exports in this classification amounted to $134,234 as compared with $186,922 in March, while for April, 1929, a valuation of $171,607 was noted.

Open Canadian Fairchild Plant

MONTREAL (QUE.)—Fairchild Aircraft of Canada, Ltd., is now manufacturing its planes in Canada. The company's plant at Longueuil, on the south shore of the St. Lawrence River, opposite this city, has been completed and production is underway. There are said to be sufficient orders on hand to keep the factory operating at capacity for three or four months. A private testing field has been prepared by the company, as well as a public seaplane harbor on the St. Lawrence. A breakwater, 750 ft. long, has been built for use as a slip way, and a seaplane tender and other equipment is on order.

HIGH POINTS in the NEWS

▶ *From Brazil.* Graf Zeppelin with twenty passengers, arrives at Lakehurst from Pernambuco on last stage of Pan-American flight after successfully weathering storms.

▶ *Gliders and Chutes.* Inspectors and engineers of the Aeronautics Branch hold meeting in Washington and decide gliders, glider pilots, and parachutes should be licensed.

▶ *Charge dropped.* Curtiss Assets Corp. drops patent infringement suit against Waco Aircraft Co. as latter applies for membership in Manufacturers' Aircraft Association. Case against Ford, however, is still pending.

▶ *Marine victorious.* Eleventh Curtiss Marine Trophy Race won by Capt. Arthur H. Page, Marine Corps, who flew his D-12 powered, F6C3 Model Curtiss Hawk over the 100-mi. course at an average rate of 164.08 m.p.h.—a new record for the race.

▶ *Not reconsidered.* Secretary of Commerce must furnish Senate with data on aircraft accidents, since move to reconsider recently-passed Bratton resolution is voted down.

▶ *Up and down.* Aero exports for April rose in the engine division, but were lower for planes and parts. In April, 29 engines sent worth $109,324; in March, 19 worth $98,958.

Airports and Airlines

▶ *Computed.* Schedule of rates of payment for mail operators under Watres Bill announced by Postmaster General Brown.

▶ *Down east.* First New England air tour, held May 27-30, touched at sixteen cities and was followed by races at Bowles Airport, Springfield. Twenty-five to thirty craft participated each of the four tour days.

Foreign

▶ *An Italian conquest.* Maj. Umberto Maddalena and co-pilot Lieut. Fausto Cecconi stay aloft 67 hr. 15 min. without refueling, thereby breaking former endurance record of 65 hr. 26 min., held by Germans Risticz and Zimmerman.

Mono Aircraft Plans to Move

MOLINE (ILL.)—Donald A. Luscombe, president of the Mono Aircraft Corp., has announced that plans are being made to move Mono Aircraft and the Lambert Engine Co. from here before the end of the year. To where, it has not yet been decided, but this action is promised because the city recently vetoed a two-mill tax bill, by which funds were to be raised for improving the airport here.

Page Wins Curtiss Race at 164 M.P.H.

David S. Ingalls Trophy Goes to Lieut. W. Harrigan

ANACOSTIA (D. C.)—By averaging 164.08 m.p.h., Capt. Arthur H. Page, U. S. Marine Corps, won the Curtiss Marine Trophy Race here Saturday, May 31, flying a D-12 powered Curtiss Hawk of the F6C3 model. The speed is a new record for the event, Lieut. Tomlinson's 1929 winning time of 162.0 m.p.h. being the best previous mark. Lieut. A. P. Storrs, who flew a fine race in his Wasp-powered Curtiss Hawk, was runner-up to Page, establishing an average speed of 152.96 m.p.h.

It is interesting to note that the Curtiss Race was won two years ago in the same type of plane as that used by Page Saturday. This was on the occasion of Major Lutz' victory with a speed of 157.6 m.p.h. It is understood, however, that Lieut. Page's craft was specially "cleaned" for the competition.

Lieut. (J. G.) Ward Harrigan furnished the upset of the race by pushing his Whirlwind Consolidated NY training plane, whose rated speed is 92 m.p.h., to a speed of 102.02, making him the winner of the Ingalls Trophy. This award, donated by David S. Ingalls, Ass't Sec. of the Navy for Aeronautics, goes to the pilot who achieves the best percentage of the rated speed of his plane. A figure of merit of 1.109 was calculated for Lieut. Harrigan's performance.

Class Winners Named

In a surprise finish Lieut. J. E. Dyer, winner of the Schiff Trophy for 1929, flew his two-seater Wasp-powered Vought Corsair to a speed of 145.81 to place third in the race, beating out three of the single-seater fighting planes.

Winners of the various classes were as follows: Fighting planes: First, Capt. Page; second, Lieut. Storrs; Observation planes: first, Lieut. Dyer; second, Lieut. C. C. Champion, former holder of the world's altitude record, Wasp Vought Corsair O2U, speed 144.98.

Torpedo and bombing planes: first, Lieut. P. D. Stroop, Hornet-engined Martin T4M, speed 118.72. (Lieut. Stroop gave Lieut. Dyer a close run for the Ingalls Trophy, Lieut. Stroop's plane having a rated speed of 112 m.p.h.). No other planes finished in this class.

Amphibion planes: first, Lieut. T. D. Guinn, Wasp Loening OL-8, 117.84; second, Ensign W. E. Burdick, same type plane, 113.8. Training planes: first, Lieut. Harrigan; second, Lieut. S. E. Burroughs, Whirlwind Consolidated NY, 101.26.

Capt. Page's 600 hp. Curtiss D-12 engine was the only water-cooled plant entered in the race. Because of it, victory was predicted for him previous to the event. However, the Captain flew a very smart race, gaining considerable time in rounding the pylons. A stiff wind made that operation more difficult than usual, and caused the disqualification of one pilot who came short of the pylon. Another deliberately failed to round the marker in order to avoid collision with another plane. Five planes were forced down because of engine trouble. Fire broke out in the engine of Lieut. DeLong's torpedo plane as he was coming up the home stretch on his fourth lap. Quick work with a hand extinguisher prevented any serious trouble, however.

Other Features on Program

Exhibitions included the release of a glider from the dirigible "Los Angeles" and the attachment thereto of a plane by agency of the special hook and trapeze developed by the Navy. Aerobatics, and formation flying offered added interest. Lieut. Thomas Settle made his first glider flight in his descent from the Los Angeles when illness prevented Lieut. Barnaby from performing the feat—which he has executed several times—at the Curtiss Marine event. Lieut. Settle is a qualified airplane and dirigible pilot.

Lieut. Comdr. Charles A. Nicholson piloted the plane to mid-air attachment beneath the "Los Angeles," while Lieut. M. B. Gardner, operations officer of the Anacostia Naval Station, performed in exhibition flight for the spectators. Among his evolutions was the inverted falling leaf developed by Lieut. Al Williams. Formation flying was offered by twelve Marine fighting planes under the leadership of Lieut. Christian F. Schilt.

Glenn H. Curtiss, donor of the Curtiss Marine Trophy, was present at the competition. Mr. Curtiss presented Capt. Page with the race trophy, while the Assistant Secretary of the Navy, Hon. David S. Ingalls presented the award bearing his name to Lieut. Ward Harrigan. It was estimated that some 70,000 viewed the race.

This was the eleventh run of the Curtiss Marine Trophy Race. Winners, planes, and times in the last five races are as follows: 1922, Lieut. A. W. Gorton, U. S. Navy, Navy TR-1 N.A.F., 112.6 m.p.h.; 1924, Lieut. L. V. Grant, U. S. Navy, Vought VE-7, 116.1 m.p.h.; 1926, Lieut. T. P. Jeter, U. S. Navy, Curtiss F6C1, 130.94 m.p.h.; 1928, Maj. C. A. Lutz, U. S. Marines, Curtiss Hawk F6C3, 157.6 m.p.h.; and 1929, Lieut. W. G. Tomlinson, U. S. Navy, Curtiss Hawk F7C, 162.0 m.p.h.

Curtiss-Waco Suit Is Dropped

NEW YORK (N. Y.)—With application of the Waco Aircraft Co. for membership in the Manufacturers' Aircraft Association, the Curtiss Assets Corp. has dropped its suit claiming patent infringement by that firm. Granted membership in the M.A.A., Waco would become a party to the amended cross license agreement under which the association holds aircraft patents and licenses them for use.

Action was opened by the Curtiss firm against the Ford Motor Co. as well as the Waco Aircraft Co. (AVIATION, May 24, p. 1056). The suit against the Ford concern is still pending.

Reports on Accidents Since May 20 Required

WASHINGTON (D. C.)—As a result of the passage by the Senate of the Bratton resolution, all facts collected by the Department of Commerce concerning air accidents since May 20, 1930, will be made public. The resolution requires the Secretary of Commerce to furnish such information to the Senate, since the recent motion to reconsider the measure was voted down making the resolution effective at once, i.e., May 20.

Immediately after passage of the Bratton measure, Senator Bingham urged the commerce committee of the Senate to take action on his bill empowering the Secretary of Commerce to subpoena witnesses having information of accidents, and to protect the department from suits based on information given out by it on such accidents. The bill was reported out with two amendments.

Senator Bratton's amendment prohibiting the removal of evidence for three days after an accident, unless by properly constituted authority, has been changed at the suggestion of the Department of Commerce to allow such removal "for the purpose of preserving or protecting human life or mail matter." The purpose of this phrase is to prevent further accidents which might occur from the presence of wreckage.

Navy Order to Glenn L. Martin

BALTIMORE (MD.)—The Glenn L. Martin Co. has been awarded a contract by the Navy Department for the construction of twenty-five boat-type patrol planes for the scouting fleet at a cost of $1,396,491, thus making fifty-five planes of this type that have been contracted for but not yet delivered. The first of these planes will be delivered in June. They will be twin-engined with a total of 1,150 hp., a useful load of 6,000 lb., and a full load of 14,500 lb. They are designed for a cruising speed of 127 m.p.h. and a cruising range of 750 mi. Built entirely of metal, the planes will cost $44,500 less engines and instruments. The total of undelivered orders the Glenn L. Martin Co. now has on hand amounts to over $4,000,000. One thousand two hundred and fifty men are at work at the factory.

Prizes Total $100,000 For National Air Races

CHICAGO (ILL.)—Cash prizes and trophies totaling more than $100,000 are to be awarded the winners of the various events comprising the 1930 National Air Races, which will be held at Curtiss-Chicago Airport, August 23-September 1.

Announcement that this large sum had been set aside for prizes was made at a meeting of private plane owners and flying service and air line operators at the Curtiss field last week. The meeting followed an aerial parade of some 75 planes, which assembled at Chicago Municipal Airport, the Hillside and Pal-waukee ports, circled the "Loop" district in formation for the purpose of arousing interest in the races locally, and then flew on to the Curtiss port where they landed.

While all the awards have not yet been made public, it is known that $7,500 will go to the winner of one of the five derbies, probably the non-stop event, and that $10,000 in cash will be divided among winners of the first three places in the race for the Thompson Trophy. The latter is a free-for-all closed circuit race, 20 times around a 5-mi. closed course, and was won at Cleveland last year by the low-wing Travel Air "S."

Perpetual Trophy Included

One-half of the prize money offered the winners of the race this year has been contributed by Charles E. Thompson, head of Thompson Products, Inc., Cleveland parts manufacturer, and the remainder by the air race management. In addition, Mr. Thompson has donated a perpetual trophy, which is to be retained for one year by the nation, or organization, represented by the winning plane.

The trophy is a figure of the mythological character, Icarus. It is 40 in. high, and is made of gold ond silver, with a base of marble. Surmounting it is a reproduction of the Travel Air plane. This model will be changed each time that the speed made by the winner betters all previous marks set in the competition. Gold, silver, and bronze plaques of the trophy will be awarded the three place winners besides the cash prizes.

Tell of Various Events

Forty-three major events, in addition to the Thompson Trophy Race, are scheduled to be held. These include five races solely for military and naval craft, five exclusively for women, and five for the sportsman pilot.

There will be other events, such as parachute jumping and dead stick landing contests, free-for-all races for planes of all types, speed contests for open and closed planes with engines of various classes, and free-for-all races for planes falling into those classifications. The grouping of the planes in the class races will be done entirely on a basis of the number of cubic inches of piston displacement. (The schedule of the main events appears in the tabulation given above.)

Besides the major contests, there will be a number of gliding and soaring events and short distance races to outlying points. The contest committee has recognized the importance of the gliding movement and plans to open the program each day with a number of glider contests. W. Hawley Bowlus is the first formal entry in this division of the National Air Races.

A nation-wide model airplane contest will likewise be held. Preliminary trials are to be conducted in various parts of the country and the winners will vie with each other for the model airplane building championship at the time of the races.

Maj. R. W. Schroeder, in speaking of the racing events before the gathering of private owners and operators, said that every effort would be made to please both the industry and the public. He defended aerobatics as being necessary to attract the public, but said that an attempt would be made to place this type of flying upon a much higher plane than ever before. He hopes to avoid too much of the circus atmosphere.

A 5-mi. closed course has been laid out, with the pylon marking the start and finish of each event located on the field immediately in front of the grandstand, so that the spectators may follow the planes about the entire circuit with little effort. By this arrangement with the race horse starts that are planned, the closed course races should have a wide appeal.

The contestants in the five derbies that have been tentatively scheduled will all be brought into one control point, approximately twenty minutes from Curtiss field by air, from where they will fly to the finish line. This system is being adopted so that the derbies will somewhat resemble races at the finish as well as at the start. Two of the five derbies will be for women, two for men, and one is to be the non-stop event.

It was also announced at the meeting that entrants from Germany, France, Italy and other foreign countries are expected to participate in the races this year. Negotiations are being conducted in an effort to bring the plane, which won the British Schneider Cup, to this country so that it may be displayed here during race week.

The Navy Department has agreed to send a squadron of eighteen Navy fighting planes to Chicago, a squadron of twelve Marine Corps fighters, a three-plane circus, and the dirigible "Los Angeles." The Army Air Corps will be equally well represented, while an attempt will be made to bring the Graf Zeppelin to Chicago.

*Schedule of Events for the 1930 Air Races**

Number and Event	Piston Displacement
1. Women's closed course race (open planes)	500 cu.in.
2. Women's closed course race (cabin planes)	500 cu.in.
3. Civilian free-for-all race	110 cu.in.
4. U. S. Marine Corps closed course race	No limit
5. Civilian closed course race (open planes)	275 cu.in.
6. Civilian closed course race (cabin planes)	275 cu.in.
7. Civilian free-for-all race	275 cu.in.
8. U. S. Army closed course race	No limit
9. U. S. Army closed course race	No limit
10. Civilian closed course race (OX-5 open planes)	510 cu.in.
11. Civilian closed course race (OX-5 closed planes)	510 cu.in.
12. Civilian closed course race (open planes)	350 cu.in.
13. Civilian closed course race (cabin planes)	350 cu.in.
14. Civilian free-for-all race	350 cu.in.
15. Civilian closed course race (open planes)	450 cu.in.
16. Civilian closed course race (cabin planes)	450 cu.in.
17. Civilian free-for-all race	450 cu.in.
18. Civilian closed course race (open planes)	650 cu.in.
19. Civilian closed course race (cabin planes)	650 cu.in.
20. Civilian free-for-all race	650 cu.in.
21. National Guard, Liberty Engine Builders' Trophy	Liberty engines
22. Civilian closed course race (open planes)	800 cu.in.
23. Civilian closed course race (cabin planes)	800 cu.in.
24. Civilian free-for-all race	800 cu.in.
25. Parachute jumping contest	.....
26. Civilian closed course race (open planes)	1,000 cu.in.
27. Civilian closed course race (cabin planes)	1,000 cu.in.
28. Civilian free-for-all race	1,000 cu.in.
29. Civilian, Air Transport and Efficiency Contest	No limit
30. Civilian multi-engined closed course race	No limit
31. U. S. Navy closed course race	No limit
32. Thompson Trophy Race	No limit
33. Civilian dead stick landing contest	No limit
34. Women's closed course race (open planes)	800 cu.in.
35. Women's closed course race (cabin planes)	800 cu.in.
36. Women's dead stick landing contest	No limit
37. Civilian balloon bursting contest	No limit
38. Civilian aerobatic exhibition	No limit
39. Civilian speed and efficiency contest (cabin planes)	800 cu.in.
40. Sportsman pilots' race	350 cu.in.
41. Sportsman pilots' race	450 cu.in.
42. Sportsman pilots' race	650 cu.in.
43. Sportsman pilots' race	800 cu.in.
44. Sportsman pilots' race	1,000 cu.in.

*A fee of $100 will be charged those entering one or more of the events with the exception of events 4, 8, 9, 21, 25, 31, 33, 36, 37, and 38, for which there are no charges.

Plan to License Gliders and Chutes

Other Rules Formulated At Aero Branch Meeting

WASHINGTON (D.C.) — Regulations vitally affecting the glider industry have been drawn up at a conference of supervising and engineering inspectors and officials of the Department of Commerce and await only the signature of the Assistant Secretary of Commerce for Aeronautics, Col. Clarence M. Young, before becoming effective. Three phases of glider activities are dealt with in the provisions.

During the course of the meetings parachutes also came up for discussion and several important rulings concerning those devices were made the most momentous of which was one calling for parachute ATC's.

Rule on Packing of Chutes

It was also decided that chutes in use will have to be repacked once every 60 days, and in all likelihood licenses will be required of parachute packers. If the latter requirement goes into effect some arrangement probably will be made whereby individuals who have occasion to pack their own parachutes would be given an opportunity to show their proficiency and receive some form of license.

After October 1, all gliders will be required to have an approved type certificate or a group two approval. Until that time they will be eligible for licensing if they can satisfactorily pass a line inspection, which may include a flight test if such appears necessary. No engineering data will be required. (Group two approvals are those on aircraft which are not built according to ATC's, but are airworthy. Engineering data must be submitted to the Aeronautics Branch for these approvals and flight tests conducted. Such licenses are usually obtained on experimental craft, those whose designs represent slight modifications in planes holding ATC's, or craft to be built in limited quantities.)

Inspectors Glide

When the regulations go into effect licenses will be obligatory, not only for gliders, but for their pilots and for student glider pilots. The requirements for the personnel, however, will be far less exacting than are the standards for airplane pilots. Students glider fliers will not be required to undergo any medical examination, needing only to pass the tests taken by student airplane pilots.

Colonel Young made his first glider flight during the conference of the inspectors, held at Washington. Three primary gliders—a Detroit Gull, an Eaglerock, and a German (A K)—were flown by men attending the meeting, to gain first hand information as an aid to the formulation of the regulations. A land collision with slight damage to two gliders occurred when an inspector, making a down-wind turn in the German craft found himself without sufficient rudder to avoid skidding into the Detroit Gull.

Flight tests have been made on several gliders on which engineering data has been submitted to the Aeronautics Branch. The issuance of the first group two glider license is expected very shortly.

Conditions which the Department exacts of gliders are, briefly, that they shall possess lateral stability, without undue tendency to fall into a spin; good balance, and satisfactorily operating controls. The six-spin test to which powered airplanes are put for their ATC's naturally will be waived for the gliders.

Turner Lowers East-West Time

GLENDALE (CALIF.) — A one-stop East-to-West transcontinental flight was completed by Captain Roscoe Turner on May 27, in 18 hr. 42 min. 54 sec. flying time. Captain Turner used a Lockheed Air Express in his trip, which shortened Capt. Frank M. Hawks' non-stop mark over the same route by 27 min. 38 sec. Best flying conditions from New York to Wichita, where the refueling stop was made, were found at around 2,000 ft., Captain Turner reported, while from there to the Coast the most favorable area was encountered at altitudes in the neighborhood of 6,600 ft.

"QUOTES"

True. "The trouble is that every time one crawls into an old crate and gets killed, the damage, as regrettable as it is, does not stop with his death. We have seen aviation set back a year in many towns because of such accidents, and they would have been avoided by proper legislation."—E. R. BENTLEY, Florida American Legion.

How About It, Designers? "There is one improvement we women ask—that planes be made so we can reach the rudder bar with our feet without the use of pillows."—MISS MAY MCCORMICK, licensed woman flier.

You're Joking, Will. "If more people laid down books without reading them, we would have more Lindberghs and fewer Loebs and Leopolds."—WILL ROGERS.

"St. Louis Robin" to Gulf Firm

PITTSBURGH (PA.) — Gulf Refining Co., it is announced here, has purchased the Challenger powered "St. Louis Robin," in which Jackson and O'Brine established the refueling endurance record of 17 days 12 hr. 21 min. last summer at St. Louis. The plane, whose engine employed Gulfpride Oil in its endurance flight, will be in charge of Pilot W. L. Case. The craft will shortly be included in the Curtiss-Wright Aerial Exhibition tour.

Glenn H. Curtiss Flies From Albany to New York Over Same Route He Traversed in May of 1910

NEW YORK (N. Y.) — Twenty years after he had won a $10,000 prize for his flight from Albany to New York, Glenn H. Curtiss, pioneer airman, flew over the same route in a Curtiss Condor on May 30, the anniversary of the 1910 trip.

Another Condor, a Wasp-powered Sikorsky, a Ford, a Keystone Patrician, and a Curtiss Falcon from Mitchel Field, accompanied him. In contrast with the 2 hr. and 32 min. taken by Glenn Curtiss a score of years ago, the distance was negotiated on Decoration Day in 1 hr. 20 min.

The Aeronautical Chamber of Commerce in coöperation with the Albany and New York commerce chambers sponsored the commemorative exercises.

Though Capt. Frank T. Courtney of the Curtiss-Wright Corp., piloted the Condor carrying the early flier, Mr. Curtiss took over the controls during part of the journey albeit he had only been in the air a few times in the last two decades.

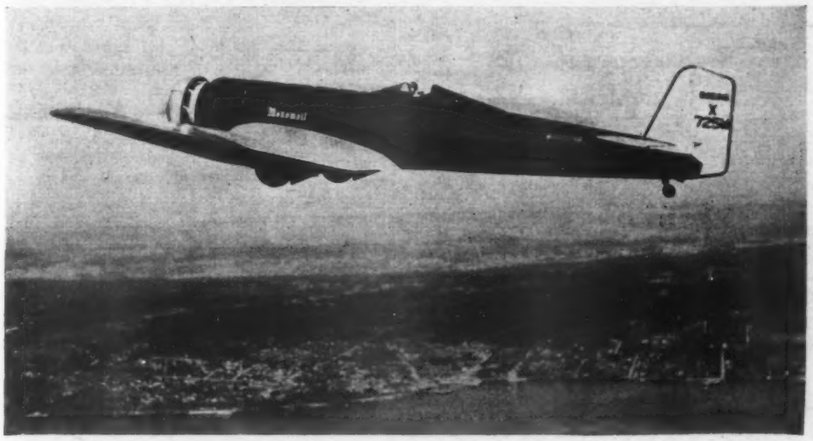
Mrs. Glenn H. Curtiss and Glenn H. Curtiss, Jr., were among the transport craft's sixteen guests, a group which included backers of the 1910 venture and friends who observed the flight from a train which raced the Albany-New York flier.

Jacob Ten Eyck, official starter of the early record-breaking trip; and Don C. Seitz, Elmer E. Robinson, and Alan R. Hawley, also identified with the epochal flight, were included in the Condor's party.

Others who traveled on various of the craft comprising the anniversary fleet were William E. Fitzsimmons, vice-president of the Albany Chamber of Commerce; Lieut. "Hez" McClellan, representing F. Trubee Davison, Assistant Secretary of War for Aeronautics; Mayor John Boyd Thatcher, 2nd, of Albany; James C. Willson, aviation magnate; Henry White, pilot of his Sikorsky; Peter J. Brady, head of Mayor James J. Walker's committee on aviation; and a group of Curtiss-Wright officials headed by Frank H. Russell.

Lieut. Gov. Herbert H. Lehman, Senator J. Griswold Webb, chairman of the New York State Aviation Committee; Maj. John Dwight Sullivan, American Legion emissary; and other civic and aeronautical officials attended the Albany ceremonies.

Boeing's Low-Wing "Monomail" Tested on Coast



ABOVE IS AN initial flight view of the new Boeing all-metal low-wing "Monomail." Built for fast transportation of air mail, this craft is stated to be capable of carrying in excess of a ton of postal matter in its three pits forward of the pilot's cockpit. A 575 hp. Pratt & Whitney Hornet powers the machine.

With the completion of tests being made by E. T. Allen, the Monomail will be placed in operation on the transcontinental mail-passenger route of the Boeing system for full service tests. In the meantime, a sister plane is receiving finishing touches at the factory. This craft will be similar to the Monomail except that it is designed to carry six passengers in addition to a mail load.

A departure from the usual is found in the Monomail landing gear which is not only retractable, but when folded back to reduce air resistance still offers enough wheel clearance to permit of emergency landings. In the photo above, the gear is shown in the retracted position.

The plane is 41 ft. in length, 12 ft. 6 in. in height, and carries a wing of 60 ft. span and 535 sq.ft. area. Weight empty is set at 4,565 lb. The engine cowling follows special Boeing design.

Steam Powered Plane Will be Tested on Coast

ALAMEDA (CALIF.)—Test flights of an airplane propelled by steam will be made at the Curtiss-Wright Airport here in the near future, according to plans announced by William J. Besler, pilot-inventor. Experimental work on the engine, a 2-cyl. compound type, has been under way for more than a year under the direction of Besler and Warren Doble, automobile engine builder. The engine will have approximately 150 hp. and weighs about 300 lb.

Besler, who has spent years studying engine development in Germany and other countries in Europe, is convinced of the practicability of steam power for airplanes and of the advantages of an external combustion engine. The test flights are to be made in a Curtiss Robin, with the cooperation of the Curtiss-Wright Flying Service.

Kinner Bird Now $3,895

GLENDALE (L. I., N. Y.)—Brunner-Winkle Aircraft Corp., this city, announces reduction in price of its Kinner-powered three-place open cockpit Bird from $4,095 to $3,895. The firm states that production is being resumed on a schedule of one plane a day.

Pennsylvania Air Tour Starts

PITTSBURGH (PA.)—Pennsylvania's air tour got underway here on May 30 when 25 planes left Rodgers Field, later landing at the Pittsburgh-Butler Airport for luncheon. Details of the trip, to last a week and cover eighteen cities, will be given in the next issue of AVIATION.

Announce New Approvals

WASHINGTON (D. C.)—New planes given approved type certificates are as follows, according to certificate number, make and designation, type, power plant, weight empty, useful load, gross weight: No. 323. Verville "AT," two-place, open biplane, Continental A-70, 1,562 lb., 678 lb., 2,240 lb.; No. 325. Stearman 4CM, one-place open biplane, Wasp Junior, 2,285 lb., 1,651 lb., 3,936 lb.; No. 236. Stearman 4DM, one-place open biplane, Wasp Junior, 2,326 lb., 1,610 lb., 3,936 lb. Approved type propeller certificate No. 174 has been assigned the Hamilton Standard Propeller Co. for its Model 25V2-0, adjustable pitch, aluminum alloy prop, having a diameter of 7' 0" and rated for 110 hp., at 2,400 r.p.m. The Curtiss-Wright Flying Service School at Grand Prairie, Tex., has been approved for Limited Commercial instruction.

Postpone Elimination Balloon Race to July 4

CLEVELAND (OHIO)—The National Elimination Balloon Race to be held at Houston, Tex., has been postponed from June 10 to July 4, according to advices received from the National Aeronautic Association by William Ganson Rose, director of the Gordon Bennett International Balloon Race and Aviation Carnival to be held here Aug. 31 and Sept. 1. The delay was decided upon to permit addition entries time to prepare for the event.

Fifteen balloons have already been entered in the elimination race, Rose has been advised. They are:

Navy No. 1—Lieut. T. G. W. Settle, pilot; Lieut. T. M. Whelan, aide.
Navy No. 2—Lieut. R. R. Dennett, pilot; Lieut. C. F. Miller, aide.
Navy No. 3—Lieut. W. Bushnell, pilot; Lieut. J. A. Greenwald, aide.
Army No. 1—Capt. Karl S. Axtater, pilot; Lieut. Ralph E. Holmes, aide.
Army No. 2—Lieut. R. W. Turnbull, pilot; Lieut. Courtland M. Brown, aide.
Army No. 3—Lieut. Walter D. Bule, pilot; Lieut. John P. Kidwell, aide.
Detroit Balloon Club No. 1—Svend A. U. Rasmussen, pilot; Tracy W. Southworth, aide.
No. 2—Waldemar A. Klikoff, pilot; Roy S. Cunningham, aide.
No. 3—Edward J. Hill, pilot; Arthur G. Schlosser, aide.
Kelvinator Balloon—Dr. George M. LeGallee, pilot; Robert W. Ebert, aide.
Aero Digest Balloon—Samuel Taylor Moore, pilot; Otto Wienecke, aide.
United Van Service, Inc., Balloon—George Hineman, pilot; Milford Vanik, aide.
Cleveland Chamber of Commerce Balloon—Goodyear pilots to be designated.
Goodyear-Zeppelin Corp. Balloon—R. J. Blair, pilot; F. J. Trotter, aide.
H. E. Honeywell will also pilot a balloon in the race.

Only two contestants in the elimination race will place on the United States team in the Gordon Bennett since Ward T. Van Orman, last year's winner, has elected to accept his privilege of not entering the elimination event.

Boeing Gets Navy Order

SEATTLE (WASH.) — The Boeing Airplane Co. has just received an order for 27 planes for the United States Navy, to cost more than $400,000. P. G. Johnson, president of the Boeing concern, said preparations to begin production on this contract would be started at once. The order is for a design of light bombing plane of the type assigned for duty on the airplane carriers. The value of the order is $405,905, or approximately $15,000 for each plane.

Report Foreign Balloon Entries

WASHINGTON (D. C.)—The N.A.A. Contest Committee is in receipt of news from the Aero Club of France, officially entering two balloons in the Gordon Bennett International Balloon Race, which leaves Cleveland September 1. A cable from the Aero Club of Germany states it will again enter the "Barmen," piloted by Dr. Hugo Kaulen, Jr.

AERONAUTICAL FINANCE

By R. R. Doane

Weekly Comparisons

Aviation:	Week Ended May 24th	Previous Week	Same Week 1929
Aviation Stock Averages	24.51	25.22	57.22
Number of Stocks Traded in (1)	45	45	66
Volume Aviation Share Sales (2)	382,700	503,400	958,500
Ratio Aviation Share Sales to Total Sales (3)	2.23	2.67	3.37
General Market Data:			
Total Volume Share Sales, N. Y. Stock and Curb Exchanges	17,099,310	18,799,850	28,383,660
Railroad Share Sales, N. Y. S. E.	395,560	359,920	1,380,100
Market Averages (N. Y. Times)	228.43	232.17	253.56
New Domestic Financing	147,083,000	118,756,000	33,355,704
Financial: (4)			
Reserve Credit Extended	931,603,000	920,023,000	1,203,516,000
Brokers Loans	4,015,000,000	4,007,000,000	5,520,000,000
Bank Exchanges, N. Y. C. H.	6,285,695,515	6,694,867,035	8,068,303,479
Investments, Reporting Mem. Bks.	5,855,000,000	5,811,000,000	5,818,000,000
Loans on Securities, R. M. Bks.	8,322,000,000	8,246,000,000	7,144,000,000
All Other Loans, R. M. Bks.	8,484,000,000	8,555,000,000	9,043,000,000

Notes—(1) All stocks actively traded in on both New York Stock Exchange and the Curb Exchange; also contains over-the-counter stocks on which bid and ask quotations are regularly published. (2) Total volume both N. Y. Stock and Curb Exchanges. (3) Percentage of aviation stock trading to total volume of sales all classes of stocks on both exchanges. (4) Weekly Reporting Member Banks, Federal Reserve System.

Foreshadowing significant developments in the financial structure and better integrated organization of this industry comes the announcement of the formation of the General Aviation Corp.—all of which means that large and conservative financial interests more or less directly connected with the House of Morgan are concerning themselves with aviation in more than a superficial or stock-jobbing way.

By this process of welding together the many diverse and specialized units catering co-jointly to the aeronautical and automotive trades, the advantages of quantity production methods should result in large savings in operating costs and reflect to the benefit of not only the merged units but be made to represent a formidable forward stride in the business of transplanting aviation from the realms of romance to the halls of business with a vastly enlarged field of practical usefulness.

This enlargement of the number of powerful groups now dominating the industry cannot help but stimulate speculation as to what the next move in the field of aviation business strategy may be. That the struggle for market dominion, or even a fair share of potential profits will witness, during the next few years, a high mortality rate among aviation companies there can be but little doubt. In this respect it might be interesting to study the probable extent and thoroughness of distribution of some of the securities now outstanding regardless of earnings or intermediate price changes.

It is only wthin a recent period that the volume of aviation security transactions could be studied with a view of ascertaining what, if anything, they might reveal of the real conditions underlying the market for them. There still may be some lingering popular belief that the daily total of sales discloses the extent of the public interest or the market's activity. However this is not always the case, as it sometimes happens that professional manipulation swells the total of sales when the market actually is dull. Also, even though a stock is listed and the market for it is genuinely strong, a relative large portion of the actual sales may be made "over-the-counter" by the banking house or security dealer direct. The volume of these sales, of course, never appears in the published volume as made through sales on the exchanges.

Nevertheless there is a method which may prove of some value in determining the extent of distribution into strong hands. The record of sales may be easily divided into two columns, one giving the total transactions when prices are advancing, and the other the total sales when prices are declining. In Table I is shown the number of shares thus dealt in, for the eight stocks employed in our aviation stock index, during the rising and declining periods of the past seventy weeks.

On the basis of these comparisons, from a purely market point of view, there are indications that both Curtiss-Wright and the United Aircraft & Transport have not fared quite so well during the secondary distribution period as have several of the others in this table. In this connection it is well to remember that in any highly active volatile stock the element of "short selling" also is to be considered. Over a long period of time short sales could have little influence as they must of necessity be eventually covered. Also it must be recalled that here we are dealing only with the official published sales and do not know the full extent of the sales at the time of the original offering which would not appear in this record.

Excluding both the Curtiss-Wright and United Aircraft firms, an examination of the table reveals that during this period the number of shares dealt in during the rise was 1,704,500 more than the number of shares of these same aircraft companies that was sold during the periods of decline. In other words, every share bought during this period may be said to have been sold again excepting 1,704,500 shares; the total

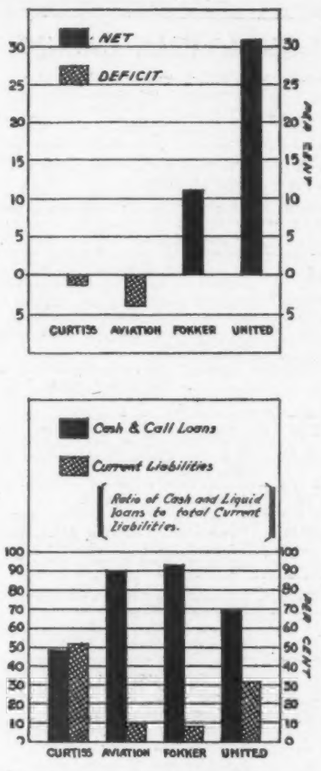
TABLE I

Stocks	Number of Shares Sold—Rising Period	Number of Shares Sold—Declining Period	Excess—Rise	Excess—Decline
United Aircraft	3,595,400	5,527,200	.....	1,931,800
Curtiss-Wright	3,195,800	3,285,200	.....	89,400
The Aviation Corp	1,666,800	1,500,600	166,200	.....
N. A. T.	1,025,100	495,000	530,100	.....
Fokker Aircraft	1,007,100	404,200	602,900	.....
T. A. T.	528,600	223,200	305,400	.....
Detroit Aircraft	374,600	373,300	1,300	.....
Av. Corp. of Am.	334,200	235,800	98,400	.....
Totals	11,727,600	12,044,500	1,704,300	2,021,200

TABLE II

Stock	Rank in Volume of Trading	Rank in Number of Shares Listed	Rank in Sales Activity	*Velocity of Sales
United Aircraft	1	3	1	4.96
Curtiss-Wright	2	1	3	2.05
The Aviation Corp	3	2	6	.99
N. A. T.	4	7	2	2.74
Fokker	5	4	5	1.41
T. A. T.	6	8	4	1.55
Detroit Aircraft	7	5	8	.84
Av. Corp. of Am.	8	6	7	.89

*The velocity of sales is obtained by securing the ratio of the total volume of shares sold to the total umber of shares officially listed with the exchanges.



At top: Earnings ratio to capital investment. Above: Cash position

transactions of these six stocks having been 8,168,500 shares.

It is, therefore, a fair inference that these 1,704,500 shares, or 20 per cent of the total transactions, are in the hands of those who intend holding them for higher prices. The remaining 80 per cent representing the speculative interest or "floating" supply.

As may be observed in Table II, both as to volume of trading and degree of sales velocity, United Aircraft easily heads the list. The remaining ranking positions, with the possible exception of Fokker, are not so clearly determined.

Although it may be argued that the above analysis covers too short a period of time, yet it must be remembered that short as the period may be, (seventy weeks from March 30, 1929, to May 24, 1930) it includes the total market experience of a majority of the stocks here brought under review.

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Curtiss Reports Deficit

The Curtiss-Wright Corp. has announced that operations for the quarter ended March 31, 1930, resulted in a net loss of $1,620,920 after deduction of $641,758 for depreciation and various reserve accounts.

Most of this loss was attributed to the fact that the company's activities in the flying phase of the industry were not as yet profitable. The first quarter is normally a time of year when such operations are at a low ebb. The marking down of the sale price of planes was also responsible for the unfavorable showing, it was stated.

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Aviation Corporation Loss

The Aviation Corp. and subsidiaries consolidated statement of profit and loss for the initial quarter of 1930 shows a loss from operations of $954,004 and a net loss of $863,651 after deducting other income and allowing for the company's proration of losses incurred by controlled companies which are not consolidated in the report.

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Detroit Sales Up

Detroit Aircraft Corp. in its statement for the month ended May 15 shows gross sales of $249,800 and net sales of $195,048. During this period orders were placed with the company for thirty planes.

Only orders actually taken during this period are listed, the report states, and no deliveries made on orders placed prior to April 15 are included. Greatly increased production schedules in both the Detroit and Lockheed plants to meet delivery dates have been established and all but nine of these ships now have been delivered.

"Government and airline contracts now pending should result in greatly increased sales for the coming four months, while the total for the current month indicates a new high record will be set," the company states.

Thompson Products To Have Aero Division

CLEVELAND (OHIO) — An aeronautics division is to be organized in Thompson Products, Inc., states president C. E. Thompson, due to the continued large production of aircraft valves and the prospects of greater growth along aeronautical lines.

Reports show that last year a 200 per cent increase was registered in the company's aeronautic transactions, with aviation sales amounting to 30 per cent of the total sales volume.

First quarter production for this year has been maintained on an equal basis, it is reported.

The new department will be quartered in a 150,000 sq.ft. section of the Cleveland plant, to be devoted entirely to aircraft valve manufacture. Advanced experimental aero work is to be carried on in a modern dynamometer laboratory.

Three Fokkers to Delta Lines

MONROE (LA.) — Three tri-engined Fokkers have been purchased by Delta Air Lines, Inc., for use on the Dallas-Atlanta run.

Hearings Continue On Navy Airship Base

WASHINGTON (D. C.) — Entering the third week of the hearings of the House Naval affairs committee on the selection of Sunnyvale or Camp Kearny, Calif., for the site of a lighter-than-air base, the possibility appears that neither site will be chosen. The General Board of the Navy, an advisory body to the Secretary of the Navy, has recommended the selection of Camp Kearny, near San Diego, while four members of the West Coast Board, a five-man board of naval aeronautical experts chosen to survey the Pacific Coast for sites, have recommended Sunnyvale.

In addition to this disagreement, three points have been brought out which make the location of the base on the southern or central California coast less of a certainty than appeared at first. According to the members of the General Board, the base should go to Camp Kearny because that site is 455 mi. nearer the Panama Canal than is the Sunnyvale site. Admiral Moffett testified, however, that the first defence of the canal by lighter-than-air craft would come from the ship stationed at Lakehurst, as that hangar is only 1900 nautical miles from Panama, as compared with a distance of 2,801 mi. from San Diego.

Moffett Recommends Secondary Bases

A second point which is assuming significance is the so-called "top-heaviness" of naval aerial activity in Southern California, as contrasted with the paucity of such activity in the Northwest.

The third point made by some members of the committee is that this station is not immediately needed. Repeated quotations have been made from former testimony to the effect that the first of the two dirigibles under contract could be housed with the Los Angeles in the present hangar at Lakehurst.

In reiterating the majority vote of the West Coast Board for the Sunnyvale site, Admiral Moffett further recommended the establishment of mooring masts at Nome, Alaska; Hawaii, Camp Kearny, and the Panama Canal. The transfer of naval heavier-than-air activities from leased fields in the vicinity of San Diego to Camp Kearny was also advocated by Admiral Moffett. He further stated that the first of the two new airships would operate on both coasts, if a hangar were provided on the West Coast, but its home base, he said, would be at Lakehurst.

Saunders Air Taxi Firm Defunct

KANSAS CITY (MO.)—The Saunders Fly-It-Yourself System located at Fairfax Airport, has ceased functioning. The organization was developed on the same principal as automobile rental agencies.

PERSONNEL

THOMAS A. MORGAN, president of North American Aviation, Inc., and a director in Curtiss-Wright Export, Inc., and other aeronautical firms, has been elected vice-president of Eastern Air Transport, Inc.

HARRY A. HAMMILL and H. S. LOWE, district sales managers for American Eagle Aircraft Corp. in the middle west, have combined their agencies, with territory including Indiana, Ohio, and parts of Michigan, Illinois, and Wisconsin.

H. A. Backus

HAROLD A. BACKUS, whose resignation as assistant to the president of Berliner-Joyce Aircraft Co. was recently announced, has assumed his new duties as quality supervisor for Metallurgical Laboratories, associate company of Summerill Tubing Co., Bridgeport, Pa. He will also be associate engineer for aircraft on the staff of Horace C. Knerr, president of Metlab and consultant to Summerill.

HEINRICH KNOTT, chief instructor at the Cape Cod Glider School, has returned to Germany.

MRS. RUTH HAVILAND SEITZ, president of the Kansas City (Kan.) chapter of the Women's N.A.A., has been made governor of the organization for Kansas.

SAMUEL TICKELL, formerly Department of Commerce inspector, has been made factory superintendent of Huntington Aircraft Corp., Stratford, Conn. F. W. BURNSIDE, JR., formerly in charge of the wholesale division of Marmon Motor Co., is now sales engineer for Huntington.

S. H. SHEPPARD and WALTER MASSIC will act as the pilots of the Goodyear-Zeppelin airship whose delivery to New England Airship Co. of New Bedford, Mass., was announced last week.

HOWARD BUSH has transferred his flying service from Pike Lake Field, Duluth, Minn., to the airport at Superior, Wis.

C. G. DIETZ, general manager of Aeronautical Corp. of America, has been elected president of the newly formed flying club of Cincinnati, Ohio.

WILEY WRIGHT, former Aeronautics Branch inspector at Oakland, Calif., has been made supervisor of the northern part of the Eighth Aeronautical District, recently expanded to include Alaska. WILLIAM ANDREWS has been made inspector for the Fresno, Calif., district, and E. V. PETTIS has been put in charge of the Oregon territory. D. C. DOAK, recently transferred from southern California, will have charge in Montana, Wyoming, and Idaho. Announcement of changes was made by E. E. MOUTON, supervising inspector of the Eighth District.

GEO. A. DAVIES, WALTER MCINERNY, STANLEY J. CHELMINIAK, and ADAM O. WILSON are members of a commission appointed by Mayor Hinkle to supervise the South Bend (Ind.) Municipal Airport.

JACK FURLONG has resigned as divisional traffic manager for S.A.T. at Tulsa, Okla., to become sales manager for Central Air College, Wichita, Kan. He is succeeded by V. C. WASON.

H. M. HOWELL, formerly comptroller of Detroit Aircraft Corp., has been appointed comptroller for Nicholas-Beazley Airplane Co., Inc., Marshall, Mo.

CHARLES G. BEECHING, formerly president of Hoffar Beeching Shipyards, Ltd., has resigned from the directorate of Boeing Aircraft of Canada, Ltd., Vancouver, B. C.

MAJ. WILLIAM BEBAN, professor of aeronautics at Iowa State College, DR. BALDWIN M. WOOD, University of California, and WILLIAM B. STOUT will be the judges who will select students from American schools to receive the W. E. Boeing aviation scholarships.

Scintilla Cuts Prices On Aircraft Magnetos

SIDNEY (N. Y.)—Reductions in prices on all standard aircraft magnetos are announced by the Scintilla Magneto Co., Sidney. Model VAG Nine D now sells for $186; type MN Seven DF for $118; type PN 5 D for $76.

The company furnishes units for engines having from one to 24 cylinders, and in addition has available replacements for the OX5, OXX6, and Hisso power plants.

All 9-cyl. Scintilla magnetos of present production are prepared for the installation of shields to prevent electrical interference with radio performance on planes. Either Breeze or Rome harnesses can be attached to the magnetos and the company announces that Scintillas now in use may be returned to the factory for equipping with the protective device.

Approximately two days are required for affixing the shields, as the operation involves machining and fitting. Shields are also provided for ignition switches and booster magnetos.

Scintilla has produced a new shop test bench, exhibited at recent aircraft shows. This bench is so constructed as to run base or flange mounted magnetos in either direction at speeds varying from 65 to 6,000 r.p.m., by means of a variable speed reversible 110 volt AC motor.

Provision has been made for testing the ground and booster circuits of magnetos. This test bench with the complete set of service tools and rotating magnet charger is designed to care for complete overhaul of all Scintilla magnetos.

AERONAUTICAL CALENDAR

May 30-June 8	Pennsylvania Goodwill Air Tour, sponsored by Aero Clubs of Philadelphia and Pittsburgh.
June 7-8	Air Circus, Rockford, Ill.
June 10	National Elimination Balloon Race Houston, Tex.
June 8-15	Annual F.A.I. Conference, Paris.
June 16-21	Second Annual Indiana Air Tour.
June 23-29	Second all-Nebraska Air Tour.
June 28	Annual R.A.F. Display, Hendon, Eng.
July 4-19	New York State Air Tour, starting from Buffalo.
July 20-Aug. 7	International Light Plane Tour, starting from Tempelhof Airport, Berlin, Germany.
July 21	All-America Flying Derby, starting from Detroit, Mich. Sponsored by American Cirrus Engines, Inc., Marysville, Mich.
Aug. 2-3	Air Meet, Danville, Ill.
Aug. 9-24	International Gliding Meet, auspices Rhoen-Rossiten Gesellschaft; the Wasserkuppe, East Prussia, Germany.
Aug. 23-Sept. 1	National Air Races, Chicago, Ill.
Sept. 1	Gordon Bennett International Balloon Race, Cleveland, Ohio

EXPOSITIONS

June 28-July 6	Pacific Coast Aeronautical Exposition, Oakland, Calif., Municipal Airport.
July 6	International Transportation Exposition, Warsaw, Poland.
Sept. 6-8	International Aero Exhibition, Stockholm, Sweden.
Nov. 28-Dec. 14	International Aero Show, Grand Palais, Paris, France, under the auspices of Chambre Syndicale des Industries Aeronautiques.

MEETINGS AND CONFERENCES

June 9-12	Semi-annual meeting, A.S.M.E., Detroit, Mich.
July 3-5	Western States Aeronautical Conference, Medford, Ore.
Aug. 26-28	S.A.E. Aeronautic Meeting, Chicago, Ill.
Sept. 1-6	Fifth International Air Congress, under the auspices of the Royal Aero Club; The Hague, Holland.

AIRPORT DEDICATIONS

June 7-8	Los Angeles Airport, Los Angeles, Calif.
June 10	Elgin, Ill., Municipal Airport.
June 14-15	Kewanee, Ill.
June 18	Dedication and meet, Dickinson, N.D.
June 20-21	Randolph Field, San Antonio, Tex.
June 21-22	Allentown, Pa., Airport.
June 23	Lincoln, Neb.
June 28	Curtiss-Steinberg Airport, E. St. Louis, Ill.
June 28-29	Tyler, Tex., Municipal Airport.
July 4	Kelso, Wash., Airport.
July 4	Curtiss-Wright Airport, Milwaukee, Wis.
July 4-5	Harrisburg, Pa.
Aug. 1-2	McGhee Tyson Airport, Knoxville Tenn.
Aug. 30-Sept. 1	Williamson Johnson Airport, Duluth, Minn.
Oct. 17-20	Denver, Colo., Municipal Airport.

BRIEFLY

Applications for the position of chief engineering draftsman in the Bureau of Aeronautics, at a salary of $2,600 per year, will be received by the U. S. Civil Service Commission, Washington, D. C., until June 9. An open competitive examination will be held. Other positions may also be filled from the list of applicants taking the test.

National Guard Races and performances by members of Curtiss-Wright Exhibition Co. featured the Tenth Annual Aircraft Exhibition, put on by the Flying Club of Baltimore, Md., which was held May 30-June 1.

American Eagle Aircraft Corp. will be permitted to continue using its present name and trade mark, according to a ruling by assistant commissioner of patents William A. Kinnan, in connection with a complaint brought by J. J. Smith of Kansas City, Kan.

The XFJ-1, experimental combat plane built by Berliner-Joyce Aircraft Corp., Baltimore, Md., for the Navy, has been sent to Anacosita for tests.

Airplanes are to be used extensively in surveying the Peace River district of British Columbia. A plane base will be established at Summit Lake.

The Second Annual Air Show at McCook, Neb., under the auspices of the American Legion, will be held June 8.

A primary glider flight mark of 1 min. 19½ sec. is claimed at St. Louis by John W. Geppert, chief instructor in navigation and meteorology for the Universal Flying School.

According to a recent survey by the Milwaukee Chamber of Commerce, about $2,500,000 is invested in airports and equipment in Wisconsin.

Ohio State University will confer the degree of D.Sc. on Orville Wright at the 53rd Annual Commencement, June 10.

Continental Oil Co., Ponca City, Okla., has accepted delivery of a new Curtiss-Robin plane. The company already has a Lockheed and a Travel Air.

George B. Peck Dry Goods Co., Kansas City, Mo., uses a plane for hurry shipments of goods from eastern manufacturers.

T. C. Ryan Aeronautical Corp., San Diego, Calif., recently sold five Great Lakes Sport Trainers in 24 hr., according to Earl D. Prudden, sales manager.

Exhibits by Aluminum Co. of America and Pan-American Airways, both designed by Jenter Exhibits, Inc., won the prizes for the finest large exhibit and for the best double booth display at the recent Aviation Show in Madison Square Garden, New York, N. Y.

The glider club at the University of Wichita was grounded temporarily by the Department of Commerce for failing to forward a bill of sale for the glider to the Department.

Air maps of about 6,500 sq.mi. of oil fields, comprising 20,000 photographs, have been made by the Texas Co. The company's New York office was recently moved from the Whitehall Building to the Chrysler Building.

Coleman (Tex.) Flying Club has been organized with M. K. Witt as president. A glider club has been formed at Kerrville, Tex., with Ralph Brockway as president.

Bristol Co., Waterbury, Conn., has been given a manufacturing and selling license from Dardalet Threadlock Corp. to use patents for self-locking screw threads.

Linde Air Products Co., Prest-O-Lite Co., Inc., Oxweld Acetylene Co., and Union Carbide Sales Co., all divisions of Union Carbide Co., have offices in the new Carbide and Carbon Building at 910 Baltimore Ave., Kansas City, Mo.

Commercial operators at Houston Municipal Airport are arranging a series of programs of exhibition flying to be given every Sunday during the summer.

Eastern Engineering representatives of Arrow Aircraft & Motors Corp. have been testing an Arrow sport powered with a Genet 88 hp. engine at Roosevelt Field.

New Firms Announced

GENESEE VALLEY FLYING SERVICE, INC., Rochester, N. Y.; capital, 200 shares of no par value; by Harold Jackson, Mayland Burns, W. V. Skall, G. F. Mills, and others.

METROPOLITAN AVIATION CORP., New York, N. Y.; capital, 3,000 shares of no par value; by Carl Henderson, Robert Vogelbach, Alexis Daydoff; to deal in aircraft.

ROBIN FLYERS, INC., Buffalo, N. Y.; capital, $20,000; by Gerald Leighbody, Daniel J. Kamphausen, George H. Starr.

Representatives Named

ARROW—E. F. Scofield, Charleston, Mo.

BARLING NB-3—W. E. Clay, South Bend, Ind.; E. E. Rasmussen, Portland, Ore.; Rodriquez Bros., Tampico, Mexico, for Mexico; George H. Coles, New York, N. Y., eastern factory representative; F. Myrten Johnston, south central factory representative; R. M. Ressler, north central factory representative; Roblee & Ebert, Davenport, Iowa, for southeastern Iowa.

STINSON—Everett S. Shipp, 2432 S. Figueroa St., Los Angeles, Calif.

BOWLUS SAILPLANES—Cassell Flying Service, for New York City, Long Island, New Jersey, and eastern Pennsylvania; Varney Air Service, Inc., Oakland, Calif., for northern California and Nevada; Hayes Aviation, Inc., Syracuse, N. Y., for eastern New York; D. G. Fleet, for western New York; R. C. Briggs, Jr., San Angelo, Tex., for territory within a 300-mi. radius; Frank Wiley, Yellowstone Flying Service, Miles City, Mont., for Montana; C. S. Burke, Detroit, for Michigan.

SCHOOLS

STANDARD FLYING SCHOOLS, Los Angeles, Calif., has added a course in glider flying to the aviation curriculum, under the direction of Capt. Douglas Keeney.

PENN SCHOOL OF AVIATION, Pittsburgh, Pa., has offered a trophy for a bomb-dropping contest open to advanced students.

RANKIN SCHOOL OF FLYING, Portland, Ore., recently gave an air circus, with five advanced students participating. Two students are undertaking a cross country flight to San Diego.

CURTISS-WRIGHT FLYING SERVICE is organizing an aviation ground school at Riverside Military Academy, Gainsville, Ga., offering 63 hr. of instruction.

CURTISS-WRIGHT FLYING SERVICE OF NEW ENGLAND is reopening a summer flying school at Edgartown, Martha's Vineyard, and reports that half the total number of students who can be cared for are signed up.

CURTISS-WRIGHT • FLYING SERVICE opened a new ground school at San Mateo, Calif., June 2.

TAMPA, FLA., RECREATION DEPARTMENT will conduct classes in airplane model construction at each of the city's 14 supervised recreation grounds. Materials will be furnished.

GENESEE VALLEY FLYING SERVICE, INC., will establish a flying school at Rochester, N. Y., airport.

Trade Tips

Bids are being asked for construction of the first unit of the marine airport at the foot of Georgia Street, Buffalo, N. Y. The unit will include a double hangar, ramp, runway and administration building, to cost about $270,000, according to Commissioner of Public Works, George F. Fisk.

Plans are being made for construction of an additional hangar at Houston (Tex.) municipal airport, and also at Houston Main Street airport.

Bids for a lighting system for Pope Field, Fort Bragg, N. C., will be opened June 12 at the office of the Constructing Quartermaster of the War Department, Washington, D. C.

N.B. Additional information concerning trade possibilities will be found in the column headed "Airport Construction Projects."

Southern Minnesota Tour Ends

MANKATO (MINN.)—More than a dozen planes participated in a Southern Minnesota Air Derby that covered fourteen cities during nine days. The tour originated at St. James, on May 22; then stopped over in turn at New Ulm, Tracy, Marshall, Canby, Slayton, Worthington, Jackson, Fremont, Albert Lea, Owatonna, Faribault, Waseca, ending the flight at Mankato, where an air meet was held on Memorial Day.

AIRPORTS AND AIRLINES

Mail Payment Rates Announced

Base Pay Supplemented By Variable Compensation

WASHINGTON (D. C.)—Postmaster General Brown announced May 27 the formula for determining the rates of pay to air mail route certificate holders, under the provisions of the Watres bill. The basic rates are as follows: $.55 per mile for 200 lb. or for 12.5 cu.ft. of space; $.65 for 400 lb. or for 25 cu.ft. of space; $.75 for 750 lb. or for 47 cu.ft. of space; $.85 for 1,000 lb. or for 62.5 cu.ft. of space; $.90 for 1,250 lb. or for 78 cu.ft. of space; $.92½ for 1,600 lb. or for 80 to 100 cu.ft. of space; $.95 for 2,000 lb. or for 125 cu.ft. of space.

For flying at night $.15 per mile will be paid. Over difficult terrain there will be a variable of $.02 per mile; through fog, $.02½; with one-way radio, $.03; with two-way radio, $.06. Further variables relate to the passenger capacity of equipment used. One and a half cents per mile will be paid on planes having a carrying capacity of two-five passengers, $.03 for six-nine passengers, $.04½ for ten-nineteen, $.06 for 20-29, and $.07½ for 30 and over.

Big Planes Considered

For multi-engine operation, when necessitated by mail and passenger loads, a payment of $.13 per mile will be made on mail loads ranging from 1,000 to 2,000 lb.

A short recess has been taken by the committee of representatives of the air mail and passenger lines which has been conferring with the Postmaster General since May 19. An attempt is being made by this committee of eleven to work out a map of airways which will contain the logical extensions and consolidations which seem necessary in view of present operations. Some 9,000 mi., or approximately 35,000 flying miles, will be added to the present map. The greater part of this mileage will be taken up by the two new transcontinental routes—the one extending from New York to St. Louis, Amarilla, Albuquerque and on to the Coast, and the other running from Atlanta to Shreveport, Midland and out to California.

In order to make up this more logical map short routes, or routes which are improperly placed with relation to the present needs of the air mail, will have to be transferred from some operators to others into whose lines they will fit more efficiently. If the operators can not agree among themselves on an airway system, Mr. Brown may select one arbitrarily.

Open Ft. Worth-New Orleans Line

FORT WORTH (TEX.)—Service on a new line between this city and New Orleans, operated by Wedell-Williams Co., was scheduled to begin June 2. The route will be flown daily in both directions, with stops at Shreveport and Dallas.

Dedicate Bowles Field at Springfield

SPRINGFIELD (MASS.)—Bowles Airport, located in Agawam, about 6 mi. west of this city, was dedicated by formal exercises, which included a dedicatory speech by former President Coolidge, on May 30. There followed two days of air races at the new port under the auspices of Springfield Air Races Corp., organized by members of the Springfield chapter of the N.A.A. for the purpose of promoting the event.

The airport is one of the largest and best developed in the East. It has been under construction for about 2 yr. with former Congressman Henry L. Bowles of this city as the chief financial backer. To date the project has cost in the neighborhood of $1,000,000 and plans have been prepared for the early installation of additional equipment in the nature of an administration building and lights.

The port includes about 300 acres. An excellent turf surface has been developed, making it an all-way field, and four macadam take-off strips, each 1,000 x 60 ft., have been installed for the use of machines desiring a smooth surface on account of heavy loads, etc. The field has a grade of .005 per cent. It is perfectly drained, partly by natural conditions and partly by artificial installation.

The steel and brick hangar measures 300x90 ft. with an ell 20 ft. wide running along the entire back for offices and shops. The building is divided into three sections but the partitions may be eliminated if desired.

The winners of the events on Saturday, May 31, were:

25-mile free-for-all, Casey Jones, Cessna, 10 min. 32 sec.
Dead stick landing, Everett Fisher, Aeromarine Klemm.
Bomb dropping, Freddie Lund, Inland Sport.
25-mi. race for planes with engines of 450 cu.in. displacement, Wilfred G. Moore, Inland Sport, 13 min. 29 1-10 sec.

The winners on the second day, June 1, were:

25-mi. race for 450 cu.in. engine displacement planes, Freddie Lund, Inland Sport, 14 min.
25-mi. race for 800 cu.in. planes, N. E. Grevenberg, Pitcairn, 11 min. 13 sec.
25-mi. National Guard race, Capt. Harry Generous, 0 11, 12. min. 09 sec.
Pony Express race, Crocker Snow, Stearman.
Balloon Bursting, Robert Fogg, Waco

First N. E. Air Tour Completed

Event Part of Aviation Survey to be Made Soon

SPRINGFIELD (MASS.)—New England's first air tour started from the Springfield Airport Tuesday, May 27, and after covering many of the principal cities in the six states comprising this territory arrived back here on Friday, May 30, at the newly dedicated Bowles Airport in Agawam, a few miles west of this city. The tour attracted much attention at all the stops and in general the affair was considered a success. Bad weather every day made the trip a good deal of a grind and interfered somewhat with the carrying out of the original schedule and itinerary. The chief change in the latter was on the first day when rain and low clouds prevented the machines from getting through to communities in the northern part of Vermont and New Hampshire.

In addition to its value as a creator of further interest in aeronautics in the New England area, the tour was significant as the first chapter in a comprehensive survey of airports and airline possibilities in that area. This survey will be very thorough and is expected to be the basis for an intelligent and aggressive program of aviation development throughout the entire territory. This sort of study is rather unique in this country, there being but one other survey plan comparable to it. This is being undertaken by the Mid-South Aviation Conference with headquarters at Memphis.

N. E. Council Sponsor

The tour was sponsored by the New England Council but many of the detailed arrangements were carried out through the Springfield Air Races Corp., which had had much to do with initiating the event some months ago. The management on the tour rested with Maj. Luke Christopher, of the National Aeronautic Association, and Col. James W. Gilson, a member of the New England Council from Connecticut. It was arranged that the planes comprising the tour fleet should be separated into three divisions, according to engine power and size, and that they would operate over slightly different itineraries in order to spread the effectiveness of the event as widely as possible. All planes met for luncheon and for overnight halts.

Of the planes which started three dropped out because of difficulties. A Bruner-Winkle Bird flown by H. C.

(*Concluded on page* 1151)

N. Y.-Atlantic City Passenger Line Opened

NEW YORK (N. Y.)—Daily passenger service between here and Atlantic City was started June 1 by New York Airways, Inc., an operating company of the Aviation Corporation of the Americas. The schedule calls for one round trip each day with a second daily round trip on Friday, Saturday and Sunday. On Saturday, also, there is a single round trip between this city and Washington by way of Atlantic City and Baltimore.

Ford and Fokker transports are used. The plane leaves Newark Municipal Airport for Atlantic city at 4:30 p.m. daily and leaves the latter city for New York at 8:15 a.m. each day. The running time is about 55 min. The second trip on the week-end leaves New York at 10 a.m. and Atlantic City at 3:20 p.m.

The round trip to Washington, operated only on Saturday, is flown according to the following schedule:

10:00 a.m.	lv. Newark ar.	4:15 p.m.
11:15 a.m.	lv. Atlantic City lv.	3:20 p.m.
12:35 p.m.	lv. Baltimore lv.	1:40 p.m.
12:55 p.m.	ar. Washington lv.	1:05 p.m.

The first flight over this through line was to start June 7. The fares are as follows: New York-Atlantic City, $14.45; New York - Baltimore, $32.45; New York-Washington, $42.50; Atlantic City-Baltimore, $18; Atlantic City - Washington, $28; Baltimore - Washington, $10.

Air Ferries Adopts W. U. Package Plan

SAN FRANCISCO (CALIF.) — Air messenger and parcel service between San Francisco, Oakland and Vallejo has been inaugurated by Air Ferries, Ltd., in conjunction with the Western Union. It is the first service of its kind in the West and is expected to be of great value to business firms, banks and individuals. Packages will be carried between bay points henceforth by Air Ferries in similiar fashion to the service provided by Colonial between New York and Boston.

Direct delivery of packages between the centers of San Francisco and Oakland in as little time as 20 min., and between downtown San Francisco and Vallejo in as little as 25 min., will be possible.

Costs as well as time of transbay delivery will be cut considerably because the arrangement eliminates the former necessity of sending messengers across the bay by ferryboat and electric train with the parcels. Air Ferries announces also an additional independent parcel service between its own terminals only. Air messenger and air parcel services will be extended to Stockton and Sacramento when the line is extended to those cities.

Name More Airports of Entry

WASHINGTON (D.C.) — Six fields along the northern border have been designated temporary ports of entry by the Treasury Department. They are: Waterloo (N. Y.) Municipal Airport; Mobodo Airport, Plattsburg, N. Y.; Scobel (Mont.) Airport; Havre (Mont.) Municipal Airport; Great Falls (Mont.) Airport; Spokane (Wash.) Municipal Airport.

Canada Reports 1929 Airway Statistics

OTTAWA (ONT.)—Final report on Canadian airline operations for 1929 has just been issued. There were 124,751 passengers carried, 3,903,908 lb. of freight and express, 430,636 lb. of mail. Total miles flown were 6,284,079, and the passenger mileage was 6,114,997. The province of Ontario ranked first in all branches by a large margin, with Quebec second except in pounds of freight, where it was exceeded by Manitoba. A total of 445 planes, of which 283 were landplanes, 119 seaplanes, 37 flying boats, and 6 amphibions, were in operation. There were 445 licensed pilots, and 212 licensed mechanics. Tabulation of air mail operations over the various routes is given below:

	Miles	Lbs.
Leamington-Pelee Is. ...	4,928	24,431
Quebec-Seven Is.	22,510	30,055
Seven Is.-Anticosti.....	1,200	3,623
Moncton Magdallen Is...	2,400	7,444
Moncton-Charlottetown..	13,183	59,712
Montreal-Rimouski	35,558	68,672
Montreal-Ottawa	5,610	2,801
Lac du Bonnet-Wadhope.	7,774	18,926
Montreal-Toronto	97,578	7,724
Montreal-Detroit 146,846		18,401
Montreal-Albany	57,145	20,680
Sioux Lookout-Red Lake	22,890	83,406
Cranberry Portage-Kississing	7,250	36,338
Toronto-Buffalo	15,273	27,909
Montreal-St. John	14,746	1,118
St. John-Halifax.....	5,040	2,021
Ottawa-St. John	11,424	3,161
Oskelaneo-Chibougamau.	520	447
Mackenzie River Service.	17,093	12,849
Special Flights	1,672	918

Dedicate Hatbox Field

MUSKOGEE (OKLA.)—Hatbox Field was dedicated as the local municipal airport May 26, in the presence of 200 visiting planes and 30,000 spectators. The field is also used by the Air Corps, and the speech of dedication was made by Maj.-Gen. James E. Fechet. The third attack group from Fort Crockett, Galveston, Tex., gave an exhibition, and Miss Laura Ingalls established a new women's record of 980 successive loops. The 370-acre field has an all-way turf surface, with minimum effective runway of 3,000 ft.

Thompson to Add Mail Line

DETROIT (MICH.)—Thompson Aeronautical Corp., operator of C.A.M. 27, will place a new mail line in operation between Pontiac and Muskegon, Mich., on June 16, according to Edwin G. Thompson, president, following a conference with Postmaster General Brown recently.

Nyrba and Seaboard Arrange Air-Rail Service

NEW YORK (N.Y.)—Air-rail passenger service between this city and Buenos Aires, with arrangements for transfer of passengers from connecting lines serving the principal cities in the United States. For the present, NYRBA line will P. MacCracken, Jr., chairman of NYRBA line. The main feature of the new service is a reduction of 1 hr. 45 min. in the scheduled time of the New York-Florida Limited on the Seaboard Air Line Railway, so that it makes connections with NYRBA planes at Miami. Passengers will leave here at 6:40 p.m. Tuesdays, arriving in Miami at 8:30 Thursday mornings, and will be transferred immediately by motor bus to planes at Cocoanut Grove. The total time required to reach Rio de Janeiro will be eight days, and Buenos Aires may be reached in one day more. Connections will also be made with branch lines to Chile and Bolivia.

Co-ordinated passenger service has also been arranged with T.A.T.-Maddux Lines, Pennsylvania Railroad, Louisville & Nashville Railroad, Richmond, Fredericksburg & Potomac Railroad, and other lines. Through tickets to any point in the West Indies or South America will be sold by all these agencies, and northbound passengers may also arrange to buy tickets through to any of the principal cities in the United States. For the present, NYRBA line will continue to operate on a weekly schedule. In anticipation of increased traffic, two more Commodore flying boats have just been put in service, bringing the total number to nine, and five more are ordered.

Aerodiesel Supplied To About 1,500 Bases

NEW YORK (N. Y.)—Anticipating the advent of greatly increased use of the Diesel type of aircraft engine in the near future, the Texas Company of this city has installed small supplies of its specially developed Aerodiesel fuel at or near about 1,500 airports in all states of the country. This fuel is what the company engineers evolved as they cooperated with the Packard staff during the development of the Packard Diesel.

Most of the supplies have been placed at wholesale bases already used by the company in its nation-wide distribution system. While in the majority of cases, therefore, the fuel is not installed directly at the airport, it is easily obtainable by advance notice or otherwise to these bases. Close co-operation with pilots requesting servicing with this fuel has been authorized by the company.

The company brought out in its comment regarding these supplies that the fuel may be stored with much less risk than gasoline on account of its low volatility. The extra precautions usually surrounding gasoline storage are not necessary, making its distribution a comparatively simple matter.

AIRPORT CONSTRUCTION PROJECTS

South

BIDS ON FOUR new buildings at Randolph Field, San Antonio, to cost approximately $668,000 will be opened June 27. These buildings include an academic building to house the school plant and armament quarters, $160,000; an administration building, composed of wing headquarters, group headquarters, theater, photographic and radio quarters, elevated water storage reservoir and beacon lighting station, $252,000; a field Air Corps shop building to include space for paint and dope storage, $200,000; and two operations and parachute buildings, $52,000.

Improvements at El Paso Municipal Airport include a concrete circle, already placed, and a 5-ft. fence to be constructed at a cost of $1,500 to prevent spectators from crowding on to field.

An addition of 15 acres to the Mobile (Ala.) airport has been purchased by the city for $3,875, and negotiations are under way for acquisition of another 25 acres.

A contract has been let to T. H. McAden for the construction of a weather bureau building at the Jacksonville Municipal Airport to cost $2,775. The building is to be complete by June 30.

The McMullen Aircraft Co., Tampa, Fla., plans to establish a combined land and seaplane base at Palm Park Field, South Jacksonville, and will erect hangars, install lights, and enlarge the field.

At the Memphis Municipal Airport, an asphalt and gravel apron, 150 ft. wide and extending along the entire frontage of hangars, is reported to be nearing completion.

The newly organized Southern Aviation Service and Transport Co., Lebanon, Tenn., has taken an option on a tract of land for a landing field to be known as Porterfield Airport.

Marshall, Tex., has purchased 211 acres of land for $17,935 for the establishment of a municipal airport. Improvements will begin in about a month.

Spearman, Tex., is having plans drawn for an airport on a tract recently acquired. Construction of a hangar will soon begin.

A proposed $150,000 bond issue to be used for the establishment of an airport at Harlingen, Tex., will be voted on in the near future.

Dyersburg, Tenn., has leased fifteen additional acres to add to its present airfield.

Central

Omaha, Neb., has let the contract to National Construction Co. for grading the municipal airport, at a cost of $109,000.

Joliet (Ill.) Park Board has awarded contract for construction of a 152x104-ft. hangar at the municipal airport to Ernest H. Swenson, on his bid of $84,307. An office, waiting room, mail, and baggage room will be part of the structure's first floor, and the second floor will have dining room, pilot's rooms, baths, office, and kitchen. Ten bids were submitted.

Two additional buildings at Curtiss-Steinberg Airport, the repair base and restaurant, are nearing completion. The west side of the airport has been fenced, and parking area designated. A new type of obstruction light, consisting of short pieces of Neon tubing, illuminates the top of a power line.

The new hangar at the airport of the Springfield (Ill.) Aviation Co. is now completed and in use. The all-metal building, which is large enough to accommodate twelve to fifteen planes, has a door opening of 84x80½ ft. with a clearance of 14 ft. It is of the conventional round-roof type and was designed by the Mississippi Valley Steel Co. of Decatur, Ill. The cost was approximately $10,000.

The Omaha city council has purchased the lighting apparatus on the Omaha Municipal Airport from J. E. Davidson, A. H. Fetters and Gould Dietz, who had advanced money to install it and leased it to the city in order to provide the equipment before funds were available. The necessary $25,849 will come out of the city aviation fund.

A new cinder runway 300x3,500 ft. is to be constructed at the Kansas City airport. Additional obstacle lights are being installed near the field.

Duluth is taking bids for the construction of a municipal hangar and administration building at the Williamson-Johnson Airport, to cost about $45,000, after plans made by Sullivan & Orrfalt, architects.

A new municipal airport rapidly is nearing completion at Niles, Mich., adjacent to the field operated by Willie E. Kysor.

The Viborg (S. D.) Airport has been put into shape and final preparations mapped for the air fair which will be held here June 5-8.

An airport one-half mile square has just been complete at Sturgis, Mich.

Alpena, Mich., is completing a 240-acre airport with 3,000-ft. runways.

East

Theodore DeRosia and Associates, Gowanda, N. Y., plan to develop a modern airport in that community. A lease has been taken on a tract of land on which it is planned to erect a hangar, provide one long runway and two cross runways. Later a system of illumination will be installed.

Plans are under consideration for a modern airport at Penn Yan, N. Y. A committee has been authorized to proceed with arrangements for runways, a suitable hangar and illumination facilities.

Improvement of facilities costing about $1,000,000 will be recommended in the forthcoming report of the Buffalo Municipal Airport advisory board.

Ludingtons Head New Transport Firm

PHILADELPHIA (PA.) — A new transport company capitalized at $1,000,000 and known as the New York-Philadelphia-Washington Airways Corp., plans to launch an hourly passenger and express service between these cities about Aug. 1. C. Townsend Ludington is chairman of the board of directors and Nicholas S. Ludington is president. Six tri-engined Stinsons, powered with 200-hp. Lycomings, are to be used. Fare will be about the same as railroad rates.

Beside the Ludingtons, the board of directors includes R. S. Saltus, Jr., Walter L. Morgan and Charles P. Savage, Jr. Amelia Earhart is vice-president in charge of public relations and Eugene Vidal is traffic manager. Paul S. Collins, formerly of N.A.T. and T.A.T., is to be operations superintendent.

Improve Lincoln, Neb. Airport

LINCOLN (NEB.)—About $7,000 is being spent on improvements at the municipal airport here preparatory to the dedication June 23. One of the frame buildings which includes refreshment stand is being remodelled, the water supply system will be completed, and a gravel area 50 x 1,320 ft. for automobile parking will be built. The dedication will coincide with the start of the second all-Nebraska Air Tour. Later in the summer, further improvements, including runway extensions, to cost $11,100, are to be undertaken.

Newark Seaplane Base Surveyed

NEWARK (N.J.)—City engineers have reported favorably on the feasibility of developing a seaplane base on Newark Bay adjoining the municipal airport. There is a minimum water depth of about 6 ft. and available operating area of about 2 sq. mi. It has not been announced what action may be expected following this report.

Nyrba Traffic Increases

NEW YORK (N.Y.)—A total of 153 passengers were carried over the entire Miami-Buenos Aires route of New York, Rio & Buenos Aires Line during April it has been announced here. Between all points a total of 1,108 passengers were carried.

Airport Dedications

NEW YORK (N.Y.)—The following airports are among those which have been dedicated recently:

May 25—Vancouver (Wash.) Municipal Airport.
West Bend (Wis.) Municipal Airport.
Palm Park Airport, South Jacksonville, Fla.
Graymere Airport, Columbia, Tenn.
May 26—Delta (Colo.) Municipal Airport.
May 30—Bowles Airport, Agawam (near Springfield), Mass.
Wood Field, Charlottesville, Va.

First N. E. Air Tour Ends

(*Continued from page* 1148)

Young was damaged on landing at Claremont, N. H., a Fairchild KR flown by R. N. Williams turned over on an attempted landing at East Greenwich, Conn., when the engine failed due to water in the gasoline, and Charles Myers returned to Springfield with his Great Lakes on the second day when a leak developed in his fuel tank. Due to business and other demands a few planes were retired from the tour before it had ended while others joined the flight as it progressed along the course.

Beside the weather, an unpleasantness of the tour was supplied by water which got into the fuel at New Bedford and at Worcester on the third and fourth days, respectively. Two planes out of New Bedford were forced down, one resulting in the above-mentioned accident. The second machine resumed its trip after changing its fuel at Charlestown, Conn. Engines on other machines threatened to cut out and caused some anxious moments.

Overnight stops were made at Concord, N. H.; New Bedford, Mass.; and Hartford, Conn. Luncheon stops were at White River Jct., Vt.; Portland, Me.; Bridgeport, Conn., and Worcester on the respective days of the tour. Planes made intermediate stops at Greenfield, Mass., Keene, N. H., Springfield, Vt., Augusta, Me., Manchester and Portsmouth, N. H., Boston, Providence and Fitchburg. Other communities were flown over en route.

Official Entry List

The planes officially entered for the tour, to which were added a number of machines at various stops which accompanied the tour unofficially, were:

Hess Argo, owned by Mass. Airways, piloted by Leonard Povey; Fleet, Fleet Aircraft, Capt. J. S. Dexter; Great Lakes, Great Lakes Aircraft, C. W. Myers; Travel Air, Shell Petroleum, James G. Haizlip; Kitty Hawk, Skyways, L. D. Parker; Bird, Brunner-Winkle Aircraft Corp., W. N. Raymond; Monocoupe, W. T. Backus, W. T. Backus; Fleet, Northeastern Aircraft, Harry J. Hermann; Waco 225, N. H. Aviation Corp., Robert S. Fogg; Special, Al Krapish, Al Krapish; Pitcairn, Pitcairn Aircraft, C. J. Faulkner; Gee Bee, Maude I. Tait, Maude I. Tait; Waco 225, Brinton-Bayles Flying Service, H. Roscoe Brinton. Waco (Taperwing), Michigan Airways, Lieut. Art Davis; Inland Sport, Inland Aircraft, W. G. Moore; Ford Transport, Ford Motor Co., C. W. Du Toit; Bellanca (Flagship), Skyways, Inc., Crocker Snow; Travel Air (open), East Coast Aircraft, Emerson Carpenter; Travel Air (open), East Coast Aircraft, John Polando; Inland Sport, Warner Motor Co., Freddie Lund; Travel Air (cabin), East Coast, Frederick L. Ames; Fleet, Nott Development Co., C. A. Nott; Bellanca, Greenfield Tap & Die Corp., J. R. Williams; Steerman, Wright Aeronautical Corp., E. F. Rhoads; Fairchild, Vacuum Oil Co., R. N. Williams; Vought Corsair, State of Connecticut, H. W. Generous; Wasp Ford, C. W. Deeds, B. L. Whelan; Bird, C. O'Brien, H. A. Young.

Plan Columbus-Chicago Service

COLUMBUS (OHIO) — Continental Airways, Inc., has announced plans for opening a passenger service between this city and Chicago about June 10,

W.E.A. Stops at Fort Worth

FORT WORTH (TEX.)—This city has been made a regular stop for Western Air Express planes, as a result of promises that immediate steps would be taken to remove the hump in the Municipal Airport. City engineers have estimated that the necessary grading can be done for $30,000, and an Aeronautics Branch representative has been asked to make recommendations so that the field may secure an A1A rating. About $150,000 of the $500,000 voted last year for airport improvements has been expended, appropriations totalling $250,000 for acquisition of additional land and construction of hangars are being considered, and the rest will be used as a reserve and for improving the field. A power line adjacent to the airport is now being moved farther away. Complete lighting equipment has already been installed.

French to Permit Landings

WASHINGTON (D.C.) — Word has been received that the French government has agreed to permit American transport planes flying between North and South American points in the vicinity of the French colonies of Guadeloupe, Martinique and French Guiana to fly over that area and to land. The agreement follows considerable negotiating with the French government on the part of the American embassy in Paris and it is expected to contribute considerably to the development of American air transport operations in South America. In the original discussions about flying in that area New York, Rio & Buenos Aires Line and Compagnie Generale Aeropostale were particularly involved.

Adapts Television to Blind Flying

GLOUCESTER (MASS.)—Invention of a practical application of television to the problem of blind flying has been announced by John Hays Hammond, Jr. A continuous transmission from a plane about to land is received by three radio direction-finders located about an airport, so that the position of the plane may be exactly determined. This is reproduced by the movement of a television eye over a model of the airport, which includes all obstructions. The model and the moving eye are transmitted by television, and reproduced on a screen in front of the pilot, so that in effect he has before him a picture of his plane's relation to the airport.

Boston Port Expansion Allowed

BOSTON (MASS.)—The bill to permit the city of Boston to acquire additional land for the expansion of its municipal airport from time to time as demand requires has been signed by Governor Allen. The airport is on filled land and part of the area to be acquired has been filled already, making necessary only grading and partial filling.

Committee on Radio Research Makes Report

WASHINGTON (D.C.) — Fourteen specific problems are listed in the first report of the Liaison Committee on Aeronautic Radio Research, presented May 31 to Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. In the opinion of the committee the present situation, in which basic research is carried on in Government laboratories, while practical applications are developed by commercial companies and apparatus is tested by the Army, Navy, and transport operators, is satisfactory. Something is still to be desired in the adaptability of planes and engines to installation of radio equipment, and the Department of Commerce is planning to issue an Aeronautics Bulletin on ignition shielding and aircraft bonding.

The problems listed for special attention are as follows: transmission data on medium high frequencies; radio receiver design; direction finders for use on airplanes; simultaneous reception of telephone and beacon service; altimeters; collision prevention; blind landing aids; characteristics of fixed antennas of various types; ice formation on antennas; ignition interference problems, including shielding, antenna design and location of radio receiver; spark plug shielding; standardization of shielding; drag of wind-driven generators; engine-driven generator problems, including ripples and voltage variation.

The committee is under the chairmanship of Harry H. Blee, director of Aeronautic development in the Department of Commerce. Other members are: Dr. J. H. Dellinger; Lieut. Comdr. D. B. Duncan; F. C. Hingsburg; Herbert Hoover, Jr.; Dr. Lewis M. Hull; George W. Lewis; Capt. H. M. McClelland; F. M. Ryan; Wesley L. Smith; Ray Stearns.

Texas Flying Service Starts Line

MIDLAND (TEX.) — Texas Flying Service, Inc., of Fort Worth, has announced inauguration of a new service between Midland and Hobbs, N. M., the new oil boom town of the Southwest. A Ryan brougham piloted by Homer Truax started the daily service May 28. The Midland plane makes connection at Hobbs with the Western Air Express westbound plane arriving at 8 a.m. It was stated that the service might be extended soon to Roswell, N. M.

Patrol Work for Canadian Firm

WINNIPEG (MAN.)—Western Canada Airways, Ltd., has been awarded a contract for 400 flying hours, to be used in patrolling the British Colombian fisheries during the salmon season. Two flying boats will be on duty from July 1-20, while an additional plane will see service from July 21-31. Maj. J. A. Motherwell, chief supervisor of fisheries, has cited the value of such patrols.

Airway Briefs

The advisory airport committee of Nashville, Tenn., has been transformed into a commission with power to select, purchase, and improve an airport, by action of the City Council. A $1,000,000 airport bond issue is to be voted on June 26.

Demands for new lighting equipment have been made by operators at Chicago Municipal Airport.

San Antonio, Tex., is $100,000 ahead of schedule in paying off the debt of $546,000 on Randolph Field. Only $295,000 remains to be paid, of which $50,000 will be paid July 1.

The office of Colonial Air Transport at Hartford, Conn., was closed June 1.

Air Ferries, Ltd., has established a through line from Oakland to Vallejo, with transfer at San Francisco, for a reduced fare of $4.50.

Runways at the new Jacksonville airport are graded ready for use, and McMullen Aircraft Co. has been granted permission to begin operations.

Eight extra sections were used to accommodate Decoration Day travelers over Colonial Air Transport's Boston-New York line.

Curtiss-Wright Flying Service has arranged its Boston-Portland schedule to co-ordinate with Colonial Air Transport. The fare is $15. Fare from Boston to Martha's Vineyard is $16, and to Nantucket, $12.95.

Ohio Air Transport, Inc., is using two Bellanca planes on the recently inaugurated line between Youngstown and Columbus.

Copies of the New York *Times* are now carried by plane from Albany to Montreal and Quebec.

Plans for air-rail service between New York and New Orleans are being considered by the Southern Railway.

McConnell Field, Nashville, Tenn., has been declared unsafe for landing by the Militia Bureau.

White Mountain Division of New England Airways will resume service this summer between Whitefield, N. H., Boston, and New York.

A special cachet was used for Albany-New York air mail May 29 to commemorate the twentieth anniversary of Glenn Curtiss' first flight between the two cities.

Ottawa Car Co., Ltd., has begun construction of an airport near Ottawa, Ont.

Voters of Moline, Ill., defeated a proposition for a tax levy which would have provided $50,000 annually for five years for improvement of the local airport.

Cards bearing photographs of pilots and a brief history of their aviation careers are now furnished to passengers on S.A.T. Division of American Airways.

During April, 2,321 passengers were carried by Universal Division of American Airways, Inc., an increase of fourteen per cent over March. The air mail poundage was 26,180, an increase of 3,072 lb. over the previous month. The greatest number of passengers were carried on the St. Louis-Chicago route.

Wauchula Airport, Inc., Wauchula, Fla., will build an airport on a 160-acre tract recently acquired.

A drive is under way to raise $100,000 for improvement of the airport at Malone, N. Y.

A bond issue of $20,000 for purchase and construction of an airport has been approved by voters of Fayetteville, Ark.

Two hangars, 100x120 ft., with 70-ft. penthouses on the side, have been completed at the Curtiss-Wright Flying Service airport at Smith and Green Spring Aves., Baltimore, Md. The airport is expected to be ready for use about July 1.

Levelling has been completed at Post (Tex.) Airport.

A building for offices and classrooms is being constructed at the Gainsville (Tex.) airport.

At McAllen-Hidalgo Municipal Airport, McAllen, Tex., a $6,000 six-plane steel hangar has just been completed.

Improvement of runways and lighting equipment is planned by the new company, organized by Lieut. Harold R. Mull to take over operation of the Cortland, N. Y., airport.

N. B. Mamer and Ralph Shrapnack recently set a new record of 9 hr. 32 min. from St. Paul to Spokane, flying a Wasp-powered Buhl plane.

A new Municipal Airport is under construction at Glasgow, Ky.

Lambert-St. Louis Field will be dedicated late this month as St. Louis Municipal Airport. The city has installed a dispensary at the field.

Dakota Airlines, Sioux Falls, S. D., which has been operating under Halley Aviation Management, is now an integral part of Rapid Airlines, of which Walter Halley is president.

Highways leading into Phoenix, Ariz., are to be marked for the convenience of aviators. Similar plans are being made at Jacksonville, Fla.

Height of a smokestack near the Buffalo (N. Y.) airport has been reduced from 150 ft. to 50 ft.

Richard Aldworth, manager of the Newark (N. J.) Airport, spoke on "America's Airways and Their Lighting" at the Second Annual Illumination Conference, New York, May 28.

Airlines which operated last year between Philadelphia, New York, and Newport, R. I., have announced plans for resuming the service this summer.

An airport has been built on George W. Pierson's dude ranch near Fresno, Calif.

Representatives of firms selling oil and gasoline at Love Field, Tex., have expressed willingness to pay the city of Dallas one cent for each gallon of gasoline sold, and ten cents for each gallon of oil. No final agreement has been reached.

Cincinnati Airport, Inc., was formed recently under the presidency of John F. Campbell to take over and operate the former Lancett Airport.

Plans have been announced by Theodore Oberman, president of Jefferson Airways, Inc., for an amphibion service along the Missouri River between St. Joseph and St. Louis, with base at Jefferson City.

Tenders will be called for two hangars for the Vancouver (B. C.) Municipal Airport. One will house land planes and one will be for seaplanes. Each will measure 106x83 ft. and will have room for twelve large planes. The cost is estimated at $60,000.

Donald Bartlett, Reno, Nev., has applied for a certificate of public convenience and necessity to operate an air service tri-weekly between Reno and Las Vegas at a rate of $.09 per mile.

Four bids were received for installation of seventeen revolving beacons and four code beacons on the Columbia Gorge section of the Portland-Pasco airway. The $29,005 bid of Wayne C. Schmitt was the lowest.

Philadelphia Air Directory Published

PHILADELPHIA (PA.)—A comprehensive air directory and guide book, the first ever issued for the Philadelphia area, has been published recently by the Aviation Committee of the Philadelphia Chamber of Commerce. The book is called "Happy Landings" and is being sent to aviation interests all over the country.

Aerial photographs of every airport in the vicinity are included. These are: Philadelphia Airport; Central Airport, Camden; William Penn Airport; Patco Airport, Norristown; Pitcairn Field, Willow Grove; Burlington County Aero Club Airport, Moorestown, N. J.; Mercer Airport, Trenton, N. J.; Somerton Airport; Keystone Field, Bristol; Essington (Pa.) seaplane base; Mustin Field, Philadelphia Navy Yard; and Bellanca Field, New Castle, Del. Obstructions, markings, weather report facilities, etc., are given. The data was gathered by Airport Consultants, Inc., of this city.

A map of the whole area indicates airports, seaplane bases, revolving beacons, flashing beacons, radio masts, air markings, mean magnetic course lines, power transmission lines, overhead electric railroads, golf courses, railroads, main through highways and secondary roads.

The directory shows that several hundred firms in Philadelphia are engaged in making some sort of material used in aviation.

[Copies may be procured from the Philadelphia Chamber of Commerce.—Ed.]

FOREIGN ACTIVITIES

First Aviation Lighting Conference Held in Berlin

BERLIN (GERMANY). — Provisional recommendations only were adopted by the First International Conference on Aviation Lighting which opened in Berlin April 28. After further study, the proposals will be submitted to the International Commission on Illumination, which will meet in England next year. However, valuable preliminary work was done by the 90 delegates who attended the recent conference, including representatives from twelve European countries, Japan, and an observer from the United States. Most immediately important, perhaps, was the establishment of a provisional list of equivalent terms for aviation lighting in English, French, and German.

After this was adopted, the conference took up the main question of the suitability of different types of lights to various purposes, covering boundary, obstruction, and landing lights, location and airway beacons, and wind indicators. It was generally agreed that boundary lights should be red, orange, or red and white in color, fixed, and placed to show the exact shape and dimensions of the field. Obstruction lights should also be fixed, red, and there was evidently a preference for strings of lights to show the size of the obstacle, instead of floodlights. Both floodlights and ground lights arranged to indicate the runway were approved for landing. It was generally agreed that airports should have prominent location beacons, but the question of type, colors, and spacing of airway beacons and lights for emergency fields led to considerable disagreement. In the closing section of the meetings, recommendations looking toward uniform mountings, especially for lights to be used on airplanes, were adopted.

Latin American Airways Grow

WASHINGTON (D. C.)—There are now about 44,000 mi. of airways in Latin America over which flying activities are carried out on regular schedules, according to a report recently compiled by the Aeronautics Trade Division of the Department of Commerce. This is about three times the mileage in operation in December, 1928, and nearly all of the lines have been inaugurated since January, 1926. Of the 372 civil aircraft in Latin American countries, more than half are in use on commercial airlines. The greatest development, according to the report, has been in Mexico, Cuba, the coast of Brazil, Argentina, and Chile.

French Build New Mail Planes

PARIS (FRANCE) — Nieuport - Delage and Societe Aerienne Bordelaise (formerly Dyle et Bacalan) have both recently introduced new mail planes. The Nieuport-Delage 740 is a ply-wood covered monoplane with three 95 hp. Salmson engines, weighing 3,300 lb. empty and 5,060 lb. loaded. The D.B 80 is a small all-metal cantilever monoplane, using either Loraine 120-150 hp. aircooled, or Hispano-Suiza 100-130 hp. watercooled engine. The payload is 440 lb., with a total weight of 2,400-2,466 lb., and endurance of about 600 mi. Both of these machines have wheel brakes.

Plan Many Cruises For the Graf Zeppelin

FRIEDRICHSHAFEN (GERMANY)—Seventeen cruises are planned for the Graf Zeppelin between June 15 and Sept. 1, calling for almost continuous operation. The schedule has been made in the belief that the dirigible can be operated in almost any weather conditions, and that the Maybach engines will need only top overhauls. These engines have not been changed since Sept. 18, 1928, when they were installed. Since that time, the airship has been flown about 85,000 mi.

The cruises planned are as follows: Over Switzerland, June 16-17; Munich and Bavarian Forest, June 21; Berlin, June 22-25; Vienna, June 27-28; Muenster, Westphalia, June 29; South German Alps, July 2; Cologne, and over the Rhine, July 5-6; Tromsoe and North Cape, Norway, July 8-11; Neustadt, July 13; Northland cruise, probably to Spitzbergen, July 15; Iceland July 22; England, Scotland, and Ireland, July 29; Darmstadt, Aug. 2-3; Madeira and Teneriffe, Aug. 5; Denmark, Sweden and Finland, Aug. 12; Mediterranean cruise over Italy, Sicily, Adria, Karst, Aug. 19; Leipzig Fair, Aug. 30-31. As on previous occasions, bookings will be made through the Hamburg-American line.

French Plane Uses Whirlwind

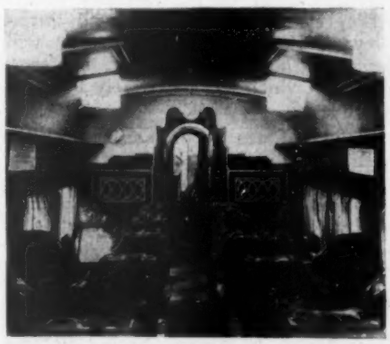
PARIS (FRANCE)—The new Dewoitine D.35 is the first French plane to use the Wright Whirlwind engine, built under license by Hispano-Suiza, as standard equipment. The machine is a four-passenger high - wing semi - cantilever monoplane, similar to the earlier D.12 model built by the same firm. Wheel brakes are used. The engine is of 300 hp.

Handley Page 40-Place Planes Near Completion

LONDON (ENGLAND)—The first of eight forty-passenger Handley Page transports to be used by Imperial Airways on Empire routes is about ready for flight testing. This machine, when put on active service, will be the largest in operation on any scheduled airline, and will represent the English company's attempt to bring closer to solution the problem of operating economy by increasing the number of passengers carried per plane.

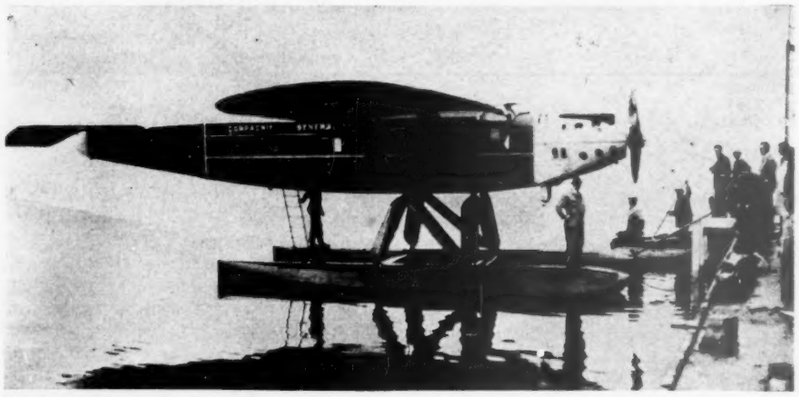
These machines are of the usual Handley Page biplane construction. The top wing has a span of 135 ft., the fuselage is 89 ft. long and the machine stands 25 ft. high. It is powered with four Rolls-Royce engines, producing a total of about 2,000 hp. The lower wing is slightly shorter than the upper wing and approaches a sesqui-plane in type.

Particular attention has been paid to the comfort of passengers. In order to eliminate noise, the cabin has been lined with Balsa wood and the fuselage has been placed below the level of the engines in order to eliminate, as much as possible, the noise and vibration from that source. The cabin is divided into two compartments, each one accommodating twenty passengers. When used on some parts of the Indian route, it is planned to carry only twenty passengers and devote the balance of the weight to cargo. Hydraulic brakes have been installed and bracing wires between the inter-plane struts have been eliminated. Each plane, following the standard European practice, will be equipped with radio. All of these airliners have Handley Page slots. It is understood that the first machines completed will be placed in service on the London-Cairo route, to care for traffic expected on the proposed London-Cape Town line.



Cabin of Handley-Page Airliner

First Mail Plane to Cross the Atlantic



IN THIS Latecoere plane, Jean Mermoz, chief pilot for Compagnie Generale Aeropostale, made the first crossing of the South Atlantic with mail. Incidentally, he established what is probably a distance record for seaplanes. Previously, in the same machine, Prevost bettered the International records for speed over 100 and 500 km. for seaplanes carrying 4,400 lb. useful load. The Latecoere 28 has a 600 hp. Hispano-Suiza engine.

Foreign Briefs

The Bleriot company is offering model 111-3, a modification of the 111 and 111-2 five-passenger low-wing monoplane using partly metal construction in place of wood.

Capt. Dieudonne Costes has expressed his approval of the 650 hp. Hispano-Suiza engine installed in the "?" preparatory to his planned Paris-New York flight. Further tests will be made before the takeoff, however, date for which has tentatively been set at June 12.

Avions Potez reports successful results of preliminary tests of a new type of fixed slot for the leading edge of an airplane wing. It is said that landing and takeoff are improved, and that stalling does not result in a spin with the plane to which the slot has been affixed.

Compagnie Generale Aeropostale has inaugurated a special weekly service between Rio de Janeiro and Buenos Aires, using eight-passenger planes, which leave each city at 5 a.m. every Wednesday morning, completing the trip at 5 p.m.

Plans are being made for establishment of a new municipal airport at Matamoros, Mexico.

Plans for a new flying boat designed to be able to carry 1,500 lb. of mail on a non-stop flight from the Azores to Bermuda have been completed by Dr. Adolf Rohrbach. The plane would use three Wasp engines.

Amhurst Billers, young English sportsman, has purchased one of the Gloster-Napier IV seaplanes designed for the 1927 Schneider Cup races, and plans to have it converted to a landplane for an attempt on the landplane speed record. It is reported that Flt.-Lieut. D. A. R. Atcherley will be the pilot.

Rolls-Royce, Ltd., has patented a new aluminum alloy known as Hiduminium, said to approach closely the strength of steel.

H. R. Ricardo, F.R.Ae.S., gave the eighteenth Wilbur Wright Memorial Lecture before the Royal Aeronautical Society in London, May 30. His subject was "The Development and Progress of Aircraft Engines."

Captain Charles Kingsford Smith plans to start his forthcoming trans-Atlantic flight from Phoenix Park, Dublin. In the "Southern Cross," he will be accompanied by Evert van Dyk, co-pilot, J. W. Stannage, radio operator, and an Irish navigator to be selected.

The London *Daily Mail* has awarded a prize of $50,000 to Miss Amy Johnson for her London to Australia flight, and announces that she will undertake a tour of Great Britain under the newspaper's sponsorship when she returns.

Societe Hanriot, branch of the French Societe Generale Aeronautique, is producing a new model 41, low-wing single-seater monoplane of wood construction using Lorraine 230 hp. radial engine.

Mlle. Maryse Bastie, former holder of the woman's endurance record, is planning an attempt to break the woman's airline distance record in her Klemm monoplane, which has 40 hp. Salmson engine.

April operations of C.A.T. in Mexico showed an eleven per cent increase over March, with 98 per cent of all trips completed. C.A.T. planes are also being used in aerial surveys for proposed highways in Mexico, between Matamoros and Mazatlan, and through the Sierra Madre west of Durango.

Improve Autogiro Performance

HAMBLE (ENGLAND) — Performance of the new model autogiro completed here recently is considered sufficiently good so that, with minor modifications, it will be put into regular production. The machine has the same ability to descend almost vertically which was a feature of previous models, while the rate of climb and top speed have been improved. The main differences consist in larger rotor blades, improved hinging, and minor constructional improvements. As before, the 80 hp. Armstrong Siddeley Genet engine is used. The Mark IIa, as it is called, will take off in about 30 yd., with the rotors at 85 r.p.m., and climb at an angle of 12 deg. at a rate of 750 ft. per min. Top speed is 90-95 m.p.h., and horizontal flight can be maintained at 25 m.p.h. Other minor refinements include a brake on the rotor base, to kill the lift by stopping the rotors as soon as the machine has landed. The production model will be known as Mark III.

Increase Japanese Service

TOKIO (JAPAN)—The triweekly service between Tokio and Dairen inaugurated by Japan Air Transport Co. is now operated daily. The trip takes about 30 hr., as an overnight stop is made at Seoul. Passenger fare is about $70, with corresponding charges to the intermediate points: Osaka, Fukuoka, Urusan, and Seoul. Class A mail is carried at $.15 for each ½ oz. (app.), postcards for $.075, and parcels at the rate of $.50 for the first 26½ oz. and $.25 for each additional 13½ oz. or fraction thereof.

Siam to Have New Mail Routes

BANGKOK (SIAM)—Two new air mail routes are soon to be inaugurated in Siam, arrangements for which have been completed by the Minister of War and the Post and Telegraph Department, according to reports received by the U. S. Department of Commerce representative. One line will cover the route Nagor Rajasima-Roi Et-Udor-Nongkai, and the other will be Nagor Rajasima-Roi Et-Nagor Panom. Both will be operated weekly, and each route can be covered in one day.

Argentina Orders Swiss Planes

BERNE (SWITZERLAND) — An order for several of the new A.C.3 planes, built by the Swiss manufacturer Alfred Comte, has been received from the Government of Argentina. The machine is a high-wing semi-cantilever monoplane, fitted with two 600 hp. Hispano-Suiza engines mounted above the wing in tandem. It may be used either as a bomber or a transport, and will carry a useful load of 5,720 lb., including fuel for an endurance of 10 hr. The payload is about 2,000 lb.

WHAT OUR *Readers Say*

A Responsibility

To the Editor:

For some time I have had this idea I am going to give you, in my mind. I have been sitting here reading Aviation, and decided it would be a good time to pass the buck—talk responsibility to someone else.

In this town of less than three thousand persons four men whom I personally know are "nuts" over airplanes. Not a one of the four ever has ridden in an airplane.

One man has $800 and something over, deposited with the Building & Loan. He has that much toward an airplane. I do not know how much, if any, the other three have set aside for the purpose of buying an airplane. But I know that within two years at the very most, all four will own machines.

And the responsibility rests on you and your associates, and the men who advertise in your magazine.

A manufacturer in New Jersey advertises some gadget for an airplane—something he has staked money on as being of benefit to airplanes or aviation. I wonder when he does it if he has this picture in his mind.

Out here in a little Kansas town are four men, all readers of every worthwhile word on aviation. Each is fortunate in having time for reading and study, each man is but averagely mechanically minded.

Without discussing the matter with the others, each has started a scrapbook. Into it goes every item that is "sold" to them by an advertisement. I have watched them for several months, closely. Additions are made to the book—and very often, each addition means a discard. As they sift the poor from the good—as they see it—they add the good to their "airplane" and discard the feature that no longer satisfies.

I am told by an air mail pilot that comes here often that all four men *know* what they are talking about when they discuss aviation with him. They don't know how to fly, but they are keen minded enough, they are sifting the good from the bad, and this mail pilot says they surprise him every once in awhile with declarations he has to go home to prove are right or wrong, and he says for his own soul's comfort too often he is on the losing end.

If there are four men here, and there may be more—how many more men are there in Kansas, Oklahoma, Nebraska, the Dakotas—everywhere—men who never have even ridden in a machine, but who technically are today buying an airplane.

I wonder if you see the responsibility in view of your desire to see aviation become what you want it to be?

An article in your magazine says production ran away with sales. Surely that's easily understandable. Never has a salesman talked to these men, and all they know is what they read—what the advertisements say and what yours and other magazines print. I'd bet even money two of the men would buy airplanes today if properly sold—along the lines they have been led to think by your publication.

What about it—are these men air-minded right, or have the ads they have been reading gotten them started wrong. Are the advertisers trying to sell these men, or are they trying to sell aviators and men who just have the money and inclination and don't give a damn what makes the propeller go round and why?

These four men are hoping they won't make a mistake. They figure a mistake in their study will eventually cost them their lives, for, as I said, they never have ridden in an airplane.

It seems to me some one is responsible for seeing these men are "sold" properly—for by their selling will dozens of others right here in this community be sold in a very few years.

And now I'll go back to worrying about my own responsibilities.

Alan Flory
Russell, Kansas

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What Are Flying Clubs Doing?

To the Editor:

As a reader of Aviation for about as many years as it has been published I feel at liberty to offer a suggestion which in the writer's opinion would be of considerable benefit to the various flying clubs throughout the country.

At the present time the flying clubs in the United States have no particular means, method or publication that might serve as a sort of clearing house for them.

Would it not be possible for Aviation to devote a small space to what might be termed "Flying Club News or Activities" and provide some means of inter-communication whereby one club may be benefited by some activity (social or otherwise) that some other club have sponsored.

For instance, the Grand Rapids Flying Club has been responsible for the promotion of the Grand Rapids Municipal Airport, although owned by Kent County, the Flying Club has held a lease on it for the past eleven years and has been instrumental in developing an Airport that will soon have an "A-1A" rating. The majority of flying clubs are formed, not merely for flying, but for the promotion of aviation in all its phases.

Incidentally, our club has more than three hundred members and if a club section were added to your magazine I believe it would have a little more personal appeal to the membership of all the clubs, and might even tend to increase your circulation.

I, for one, would be glad to know what other clubs are doing.

Byron D. Coats,
Secretary-Treasurer,
Grand Rapids Flying Club,
Grand Rapids, Mich.

[Mr. Coats' underlying idea is very welcome. Although we cannot undertake to set aside a special department for records of flying club work each week, we shall be very glad to print periodic reports of the activities of clubs that are actually engaged in flying with planes held in group ownership or leased over considerable periods by the clubs as such. We suggest that such reports should include a record of the hours of flying, of the number of members participating, type of plane used, the expenses and income and any peculiarly striking features or experiences of the operations—Ed.]

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Co-Operative Publicity

To the Editor:

I have been thinking of the advisability and possibilities of suggesting a co-operative effort on the part of the aircraft companies in the forming of a Bureau where a definite plan of advertising and publicity could be developed and carried out to encourage the use of "Avigation" as a means of transportation and travel. This Bureau would also control major news items and would place into publications not only advertisements strengthening the good will of the aircraft industry, but also interesting articles on the activities and major movements of the various departments of the entire industry.

This idea is not entirely original, but I feel that the more comments of this type you receive, the more probably will this movement develop. It seems that such a movement on the part of the aircraft industry should have been started or planned awhile ago so as to follow closely with the marvelous development and increase of the aircraft industry.

Up to now the industry has been made up of factories making planes, motors, accessories, having publica-

tions which cover their activities, and yet each and every one of t. :se companies engaged in this industry have tried to out-do each other in selling aviation to the general public—a very large task, you will admit.

The formation of mergers and the organization of the Big "4" in the aircraft industry were somewhat the result of the necessity for co-operative effort and co-operative production; yet co-operative publicity and advertising have not been organized to this day.

G. F. BARTHE
President, G. F. Barthe & Co., Syracuse, N. Y.

Editorial Comment

FROM THE DAILY PRESS

Is There Danger in the Air?

THE WEEK-END aviation news has grown to be almost a standard feature of the daily papers, and every Monday morning one looks for columns of flight stories in the space that was once divided, with a monotonous regularity, between the week-end automobile accidents and the Sunday homicides. Thus in a single week-end an air liner departs, with a minimum of flurry, from Friedrichshafen for Pernambuco; twenty men abandon ship in midair above Roosevelt Field to float in safety to the ground; and if there are reports of an accident or two, behind them there is an enormous amount of unreported air activity—thousands of people taking "joy-hops," patronizing the regular transport lines, piloting their own private air yachts or feeling their way through the air levels in gliders or sailplanes.

There is also another unreported field of air activity. No statistics can be published showing how many anxious people have deterred venturesome friends or relatives from taking to the air, on the score that it is dangerous. There is no way of tabulating the silent struggles in the individual mind which end by the individual deciding that on the whole perhaps he had better stay on the ground because "something might happen." In spite of the many thousands of flight regularly accomplished without accident, in spite of the fact that such transport lines as the Pan American Airways and the Western Air Express have never lost a passenger, the question of safety is still a real one for the aviation industry. And, in spite of many optimistic efforts, no one has as yet been able to reduce the safety factor in airplane travel to a figure that will permit of comparison with anything in the ordinary groundling's experience.

The insurance companies which are turning to aviation underwritng may be able to build up a body of actuarial statistics which will be significant. With almost all the other statistics which are prepared from time to time very little reflection is necessary to show that they are in effect meaningless. The number killed by airplanes as compared with the number killed by automobiles is without significance when there is no way of knowing the passenger-miles traveled by automobiles. It is of little use comparing the fatalities in the early days of railroading to the fatalities in aviation when aviation has to develop against the competition of the very safe railroads of today. Turning from statistics and considering the "nature of the beast," aviation seems more dangerous than surface transport on account of its high speed and the near certainty of death in case of structural failure; but no one ever hesitates to ride in an elevator, for example, although structural failure in an elevator would be even worse than in an airplane.

There is as yet no way of saying how safe aviation is. A kind of common sense tells us that it is more dangerous than railroading or steamship travel, though, perhaps, not very much more dangerous. On routes like that up the Magdalena River in Colombia, where the airplane accomplishes in a day what takes a week by the only other forms of transport available, the danger factor is so small in comparison with the great convenience as to be insignificant. But where the competition between air and ground routes is more keen, even a small factor may be deciding and a very slight additional danger may be too heavy a handicap. In settled country like the northeastern United States this competition is at its keenest, and it therefore gives the safety factor a maximum importance. The comparison suggests what is probably the truth—that while flying is still not as safe as travel by rail, the difference has become so small as to be negligible where other factors weigh heavily in favor of the airplane. —NEW YORK HERALD TRIBUNE.

Abstracts AND *Reviews*

Possibilities in Air Traffic

ABSTRACT OF AIR TRAFFIC CURRENTS *("Forschungsergebnisse des Verkehrswissenschaftlichen"); by Prof. Dr.-Ing. Carl Pirath; R. Oldenbourg; Berlin, 1929.*

AIR TRANSPORT will be used where the advantage of speed outweighs the high costs. All air transport can be divided into three classes of range: 0-300 mi. for sport and occasional flying; 500-600 mi. for continental flying, and 600-4,000 mi. for trans-oceanic or world flying. The third class is without doubt the most suitable for air transport and the question is whether there is enough exchange of valuable matter to support air transport between the centers of action of the world. The territories where industry, commerce and business have been greatly developed by existing methods of transportation are fertile soil for air transportation which can only serve domestic economy by co-operating with these existing transportation means.

The present air transportation systems of the various countries must be regarded as a great laboratory for the development of suitable equipment for world air traffic. Two factors are paramount in this development and they indicate the way to final success and justification of world air traffic: The motives of the countries; and the requirements of traffic. Both are the basis and surety of the interest of capital in developing the airways for world traffic. As to the motives, most countries have developed their air systems from political and economic viewpoints, far beyond their borders. For tying together colonies and maintaining sovereignty, air transport is today the best means to an end. The economic motives added to the political motives assure the ultimate development of aircraft to being an indispensable and valuable factor in world economy. This confidence can only be substantiated by the second factor, the requirements of traffic. Due to the higher costs of air transport, only a portion of the traffic can be counted on. The following is a study of this portion of traffic and an attempt to justify large expenditures for the necessary technical development of aircraft.

On account of the high cost of air travel, it will be used where speed compensates for the cost, or primarily over the ocean, and secondarily over land for longer stretches and for the transportation of first class passengers, mail, material of high value, and material which must be sent quickly.

This study is confined to mail and

freight. The problem is to determine what portion of the existing traffic will use air transport. Such traffic as will undoubtedly use air transport *eventually* has not been considered, in order to make this inquiry a conservative one.

The traffic flow is determined for: (1) Mail and high value freight; (2) Export and Import to determine the possible load for a plane in each direction. The entire mail traffic is considered, whereas the freight is selected as to such things as will use air transport based on the experience of existing lines. Weight, taking into consideration bulkiness, is used as a basis and it was determined that one ton of letters and printed matter require 3 cu.m. (106 cu.ft.), while one ton of packages require 7 cu.m. (247 cu.ft.) A modern freight plane, the Junkers W33, has a freight space of 4.8 cu.m. (170 cu.ft.) and a useful carrying capacity of 0.9 tons. From which it can be seen that for mail the space available is sufficient for the weight whereas for freight the space is too small, which will limit to some extent the use of aircraft for freight because of the inability of utilizing the full carrying capacity, thus increasing the cost.

The average value of the goods, not counting rare metals, transported by air on the Swiss lines in 1927-1928 was 40 marks per kg. (C. $5 per lb.) and on the English air lines during the years 1922-1927, 60 marks per kg. (C. $7.50 per lb.) Goods carried were, besides rare metals, chemicals, medicines, developed films, watches, instruments, costly cloth and furs, machine parts, technical drawings, paintings and art objects, fresh flowers, etc. The actual charges were 2 marks per ton Km. (C. 80 cents/ton-mile). From carefully worked out theoretical investigation it has been determined that the cost for trans-oceanic transport with airships or airplanes is 1.7 marks per ton-Km. (C. 70 cents/ton-mile) for 100 per cent utilization of the space available, or for the 50% utilization which can be expected 3.40 marks $1.40). Taking into consideration the higher revenue to be derived from mail, a charge of 2 marks per ton Km. (C. 80 cents/ton mile) for freight would cover costs. This gives a basis for determining the portion of the world traffic which will use air transport. In order to be conservative, only goods having a value of 60 marks per Kg. (C. $7.50/lb.) have been taken, although undoubtedly cheaper goods will use the air lines particularly for trans-oceanic services where the time saving is so much greater than over land.

The mail and high grade freight thus determined to be available for world air transport totals about 100,000 tons per year based on the traffic for 1925. Due to the fact that probably the greater portion of the packages counted will not, at first, be sent by air only 60-70 per cent of this should be counted on at the start. This 100,000 tons is about 0.07% of the world's traffic and it is interesting to note that of this 43% are letters and printed matter, 41% packages, and only 16% freight. The traffic between the various centers is shown in a figure. It is noteworthy that between centers of similar development the air export and import would be nearly equal, whereas otherwise the flow is decidedly heavier towards the less developed sections. The traffic between Europe and North America is 45 per cent of the total.

Let us now investigate whether there is sufficient traffic for profitable trans-oceanic services. As an example, the letter and printed matter traffic between Europe and North America is 16,600 tons per year, or 55 tons per day in both directions. Due to the time saving it can be assured that a postage of at least 1 mark (25 cents) per letter can be charged. Hence one ton of letters at 85,000 per ton would bring in 85,000 marks (C. $21,250). The total cost for a trans-Atlantic flight of an airplane with a six ton carrying capacity is 65,000 marks (C. $16,250), which would be covered by ¼ ton of letters leaving the balance of the carrying capacity for increasing the profit. If only 20 per cent of the mail would go by air the trans-Atlantic service would be a good business on at least a daily schedule.

Passenger traffic will follow the mail and freight as soon as comfortable and safe aircraft are available. The fare for passengers would be between 1,500-2,000 marks ($375-$500) which is not excessive compared to the fare on steamers.

The traffic currents investigated show the quantity and direction and give a basis for the economic requirement for air transport. Where the economic requirement is not so great there is a greater political motive, so that there is a tendency for the technical development and establishing of air lines all over the world simultaneously. The steamship and railroad companies should take up this development, which requires too much money for private capital, and the present unsatisfactory conditions of the continental airway systems must be regarded as necessary for the ultimate total development.

New Patents

Parachute Pack

1,755,414. FLOYD SMITH, San Diego, California, assignor to Switlik Manufacturing Co., Trenton, New Jersey. Filed September 12, 1928. Serial No. 305,603.

THIS INVENTION has for its purpose the creation of a parachute which may be more positive in action and cheaper to produce than those at present in use.

The principal feature of this parachute is that the pilot chute forms a part of the container and upon release this part is already in the air and open. It is claimed that this greatly increases safety.

Several other refinements as to method of manufacture and attaching the cords are also incorporated in this patent.

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Surface Control Mechanism

1,750,089. FRANK R. CANNEY, of Seattle, Washington, assignor to Boeing Airplane Company of Seattle, Washington. Filed March 26, 1928. Serial No. 264,894.

THIS INVENTION is designed primarily to aid control at slow speeds. It allows the upward motion of one aileron to be greater than the downward motion of the opposite one. It is claimed that this invention is effective throughout its entire distance and not only at its maximum arc of travel.

An adjustable cam mechanism absorbs the operative loads. Two adjustments are provided so that the amount of differential may be changed at will.

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Airplane Wing Connection

1,749,769. CORYDON M. JOHNSON, Farmingdale, New York, assignor to Fairchild Airplane Manufacturing Corp. of New York. Filed March 31, 1927. Serial No. 179,931.

PROVISION for a quickly detachable connection is claimed in this patent. The connection is a large pin moving into and fastening securely with a slot within the center of the wing. When the wings are spread ready for flight, the arm which controls the pin may be securely fastened.

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Airship Fins and Stabilization

1,750,141. R. H. UPSON, Detroit, Michigan, assignor to Aircraft Development, Corporation. Filed September 10, 1926. Serial No. 317,794.

IN ORDER to give better maneuverability to lighter than air craft and make the controls handle lighter this patent is for a system of fins six in number to replace the usual tail surfaces.

It is claimed that this arrangement greatly increases the stabilization both in flight and when moored.

THE BUYER'S LOG BOOK

This Log is prepared by the editors of AVIATION *purely as a service to readers. All items are published free of charge, solely on their news value, and without any advertising consideration whatsoever. Manufacturers are invited to send in material for this section.*

Onan Lighting Plant

AN ELECTRIC LIGHTING PLANT for aviation use is now manufactured by D. W. Onan & Sons, Minneapolis, Minn. The machine weighs 72 lb. and has a capacity 110 volts d.c., 800 watts. It is built of aluminum throughout, the cylinder head, piston and connecting rod being of drop forge aluminum. The unit operates 3,600 r.p.m. and can be

New 800 watt lighting plant

furnished in 110- or 220-volt d.c. It has a condenser, spark plug cover and spark plug cable housing to protect it from radio interference. Operation is possible as close as 5 or 6 ft. from a receiving set.—AVIATION, *June 7, 1930.*

Abrasive Metal Treads

ANTI-SLIP TREADS for the prevention of slipping hazards on flying boats and on ships have been recently placed on the market by the American Abrasive Metals Company, 50 Church Street, New York City. The materials employed in these treads are alumalun, feralun and bronzalun, which consist of the indicated metals with abrasive grain embodied in the wearing surface at the time of casting.—AVIATION, *June 7, 1930.*

Aviation Service Truck

A NEW TYPE OF AVIATION TRUCK to provide fuel and lubrication service to airplanes at landing fields was recently announced and put into use by the Shell Petroleum Corp., with headquarters at St. Louis. The truck has a special aviation service body mounted on a 165-in. chassis, and a three-compartment gasoline tank with a capacity of 450 gal. Each compartment is equipped with a motor driven pump for conveying the three grades of gasoline carried, through meters to the tanks in the airplanes.

Four 40-gal. tanks concealed by aluminum covers are mounted on each side of the gasoline compartments, three being for the different grades of lubricating oil, the greases and non-freeze mixtures carried, and the fourth tank for water. An air tank is provided at the rear of the truck for the inflation of landing tires and for furnishing pressure to the oil tanks.

A 5,000 candle power, chromium plated, beacon type floodlight mounted at the rear of the gasoline tanks is used for servicing planes at night. Two fire extinguishers are mounted on the platform at the back of the truck. The body and wheels of the truck are finished in yellow and red.—AVIATION, *June 7, 1930.*

Weston Aircraft Magneto

MODEL 544 MAGNETO, built by the Weston Electrical Instrument Corp., Newark, N. J., is especially designed to withstand the severe vibrations encountered in aircraft service. It is compact in size, measuring about 4 in. in overall length and 3 in. at the widest diameter. The weight is approximately 1 lb. 5 oz. The mechanical drive coupling is of standard S.A.E. dimensions which permits the magneto to be screwed and locked directly onto the tachometer coupling on the engine. The magneto is water tight. Copper cables from magneto to indicator can be of usual size and of any practical length. The voltage generated is directly proportional to the engine speed, permitting its use with an indicator having a uniformly divided scale.—AVIATION, *June 7, 1930.*

Aircraft Reamer

AN ADJUSTABLE PILOT for aircraft work can be obtained on No. 3438 spiral expansion reamer manufactured by the Greenfield Tap & Die Corp., Greenfield, Mass. The pilot has four blades sliding on taper seats which are expanded uniformly by nuts at each end of the bushing. The reamer sizes range from $\frac{5}{8}$ in. to $1\frac{1}{4}$ in., having overall lengths from $8\frac{1}{2}$ in. to 14 in.—AVIATION, *June 7, 1930.*

Parachute Back-Pad

THE Russell Parachute Co. has developed a new detachable back-pad in connection with their standard parachute harness and pack, which fits right into the seat of the airplane and holds the harness in position, while forming an additional cushion for greater comfort of the wearer. With this new arrangement flyers may leave the parachute in the seat of the airplane and fasten or unfasten the harness while seated in the cockpit in exactly the same manner as the safety belt is fastened.—AVIATION, *June 7, 1930.*

Trade Catalogs

▶*Precision Lathes.* A new general catalog No. 91-A 108 pages in length is announced by the South Bend Lathe Works. This is a two-color booklet describing and illustrating 96 sizes and types of South Bend precision lathes with their tools and attachments. Information concerning lathe construction and other data for the mechanic and shop owner are furnished.

▶*Hamilton Propellers.* Hamilton Standard Propeller Corp. now has available a 27-page catalog dealing with adjustment of pitch, replacement and straightening of blades. The strength and balance of propellers, with special reference to the Hamilton product, are taken up in the booklet.

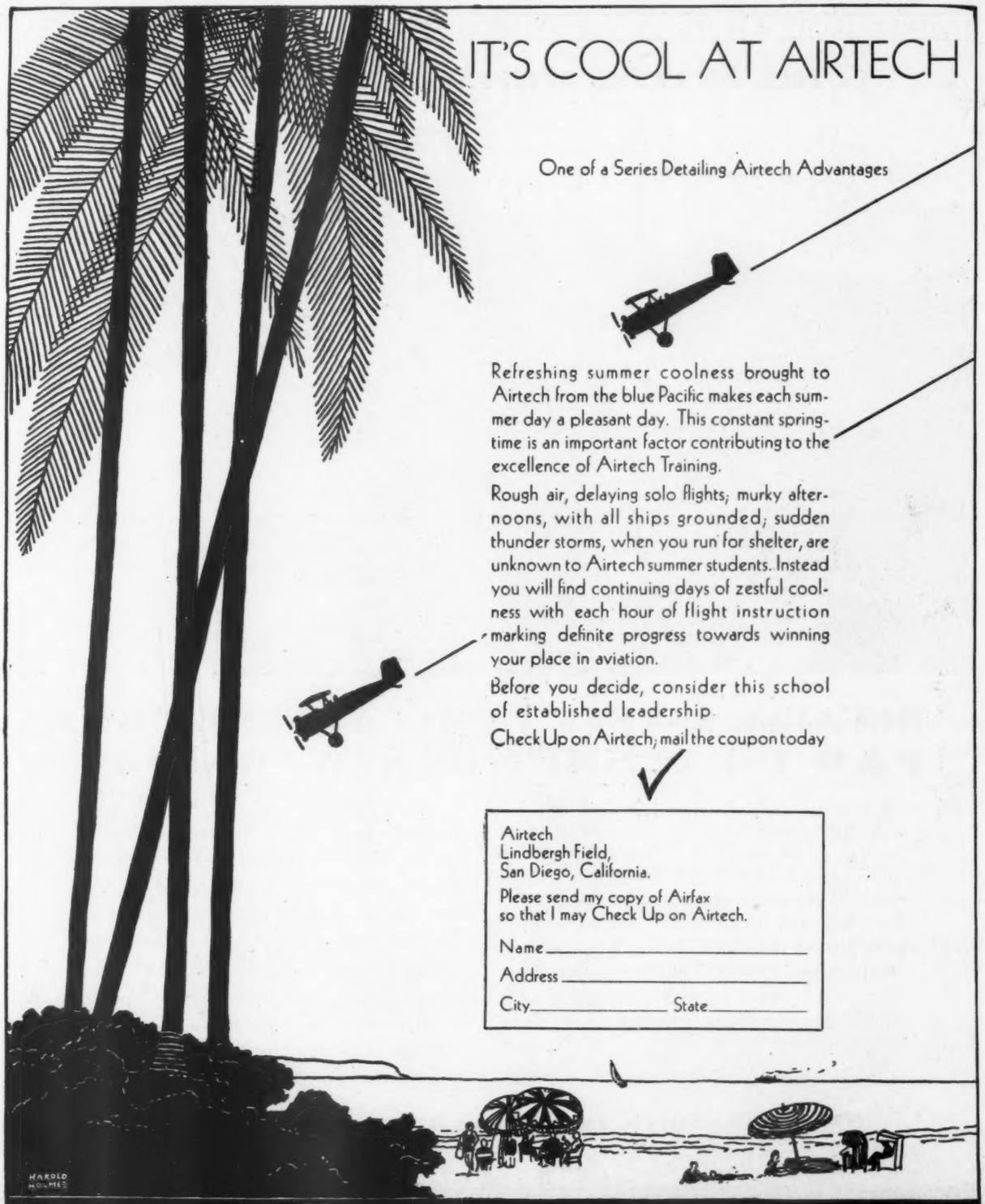
▶ *Clark Electric Tools.* A new No. 34 catalog published by James Clark, Jr. Electric Co. is just off the press and shows the company's complete line of electrically driven tools. The booklet contains 96 pages and is fully illustrated.

New Course Light

NEW DESIGN COURSE LIGHTS have been recently placed on the market by the Pyle-National Co. of Chicago. As in other projector and beacon designs of the company, the case and door ring of Type 18020 course light are of cast aluminum alloy. The reflector is of polished optical glass, silver plated. It is mounted in a cradle with an additional provision for adjustment from the outside of the case.

Type 18020 course light

Two heat resisting fresnel lenses are mounted in a spider frame in the front door. The front lens is 18 in. in diameter and the inner lens 9 in. The latter is furnished in red, green or yellow. The course light drum can be adjusted horizontally and vertically in the supporting base and yoke. Screened drain holes are provided in the drum for condensation drainage.—AVIATION, *June 7, 1930.*



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THE PRATT & WHITNEY AIRCRAFT CO.

BECAUSE SAFETY COMES BEFORE PRICE P&W USE 42 SKF's ON NEW "WASP JR."

A NEW member of the Pratt & Whitney family . . . the 300 H. P. "Wasp Jr." motor is also equipped with SKF Bearings . . . 42 of them. This motor operates at 2000 R. P. M., has a bore and stroke of 5⅜" and piston displacement of 985 cu. in. In the group we see the pilot and Pratt & Whitney engineers just after a test flight in which the motor and SKF Bearings successfully met all performance requirements.

In most industries time alone is the best test of a bearing. The first few months of operation do not tell the story for the ultimate showing determines the real cost of the bearing. Yet, in aviation, years of industrial service are rolled up into a comparatively short period of time. This makes it all the more important not to jeopardize dependability. You cannot compromise safety in the air with price. And that is the basis for the choice of SKF Bearings by Pratt & Whitney.

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Means just this

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Ball and Roller Bearings

That the manufacturers whose product is illustrated above preferred to pay more for their bearings and less for servicing or replacing them. They preferred to pay a higher price in the beginning than many times this higher price in the end. And, finally, they preferred to economize by using SKF bearings because they are made to do their job, not to fit a price list.

"HORNETS" FLY 51,000 HOURS . . . WITH BOEING

Boeing mail plane—one of several types employed by Boeing lines for mail and passenger transport. Hornet engines used exclusively.

In the service of the Boeing air transport companies, "Hornet" engines have completed over 51,000 hours of flight. Of the 50 "Hornets" in Boeing service, carrying passengers and mail on exacting day and night schedules, 15 have over 1000 hours to their credit. And one has completed over 1,675 hours in the air.

These veteran "Hornet" engines, like their famous running mates, the "Wasp" and the "Wasp Junior," thrive under the unyielding requirements of timetable flying. They make good the promise of dependability and reserve power which has its source in Pratt & Whitney design, materials and craftsmanship.

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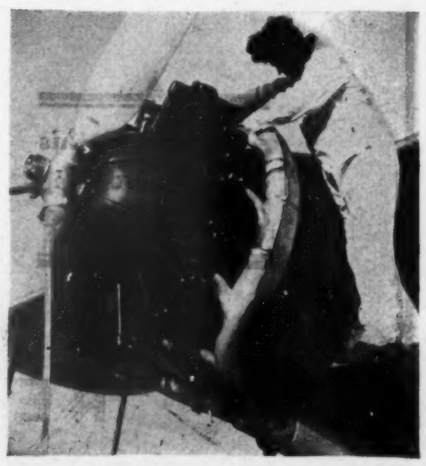


Wasp & Hornet Engines

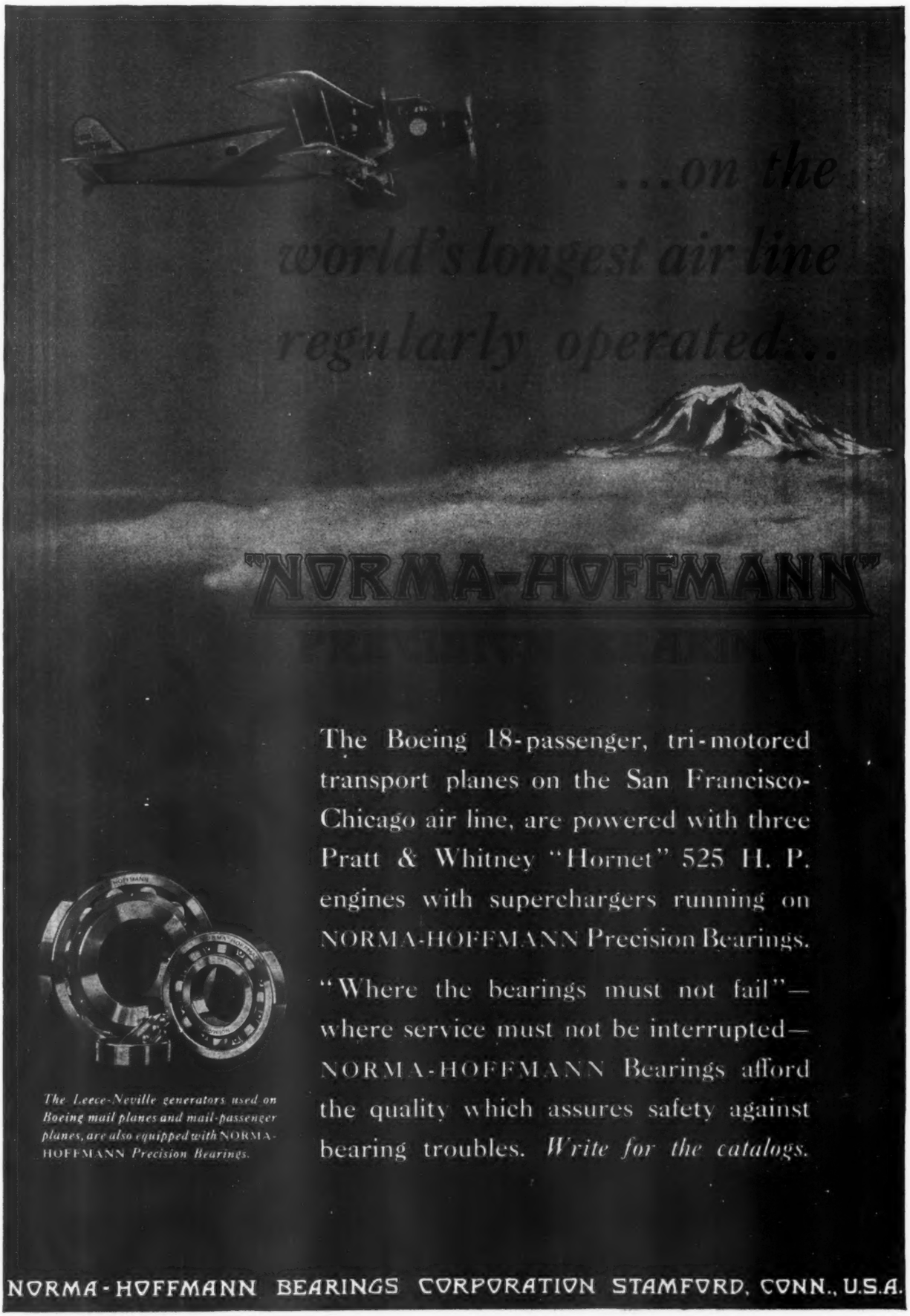
Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, P. Q.; in Continental Europe by Bavarian Motor Works, Munich; in Japan by Nakajima Aircraft Works, Tokyo.

HOLDER...World's Endurance Record

THE Original ST. LOUIS ROBIN now owned by
GULF REFINING COMPANY
exhibiting with the Curtiss-Wright Aerial Exhibition.

All planes in this exhibition are using GULFPRIDE 120

GULF REFINING COMPANY



The Boeing 18-passenger, tri-motored transport planes on the San Francisco-Chicago air line, are powered with three Pratt & Whitney "Hornet" 525 H. P. engines with superchargers running on NORMA-HOFFMANN Precision Bearings.

"Where the bearings must not fail"—where service must not be interrupted—NORMA-HOFFMANN Bearings afford the quality which assures safety against bearing troubles. *Write for the catalogs.*

The Leece-Neville generators used on Boeing mail planes and mail-passenger planes, are also equipped with NORMA-HOFFMANN *Precision Bearings.*

NORMA-HOFFMANN BEARINGS CORPORATION STAMFORD, CONN., U.S.A.

MOTO METER AVIATION INSTRUMENTS

CHARACTER

IN PILOTS—as in other men—it is quite obviously *character* that counts. Character—a word very hard to define, but that invariably makes its owner stand out from the general run.

If inanimate objects at all have something that may be called character, the Moto Meter line of aviation gauges has. But in products is it not also *the character of the organization behind them* that counts?

For nearly twenty years Moto Meter has made fine instruments. It has pioneered them and seen them become standard equipment. It has devoted constant effort toward making them simple, reliable and positive in operation.

Small wonder then that Moto Meter aviation instruments (some of which are illustrated below) are found on the panels of the big air liners, of much smaller commercial, private and service craft, and of the experimental planes that have carried so many names to fame.

Moto Meter aviation instruments in the pilot's cockpit are a sign of *character*.

Model 2893A Oil Pressure Gauge
(Illustrated above)
Built to stand vibration and shock.
Conforms to government specifications.

Model C Motor Heat Indicator
(Illustrated on left)
The finest instrument of its kind.
Conforms to government specifications.

Model CA Ice Warning Indicator
(Illustrated on right)
Warns pilot when atmospheric conditions favor formation of ice.

MOTO METER

GAUGE & EQUIPMENT CORPORATION

LONG ISLAND CITY, NEW YORK, U. S. A.
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Factories at Long Island City . Toledo . La Crosse . Canada . England
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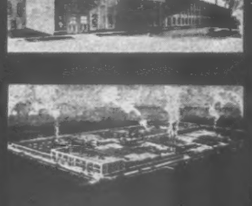

TRAVEL AIR AND ROBIN— PAY THEIR OWN WAY *for* "CONOCO"

The "Conoco" III—a Robin Cabin Monoplane

THE value of Curtiss-Wright planes to business and industry is well illustrated in the service of Continental Oil Company.

"Continental Oil has found that aviation pays its way. It is not a fad or fetish, but an essential adjunct to good business management. Time saved is money saved, and, as a result of airplane travel, Continental Oil Company saved some 15 days of executive time during one month. On several occasions, airplanes have been used to avoid delays that would have meant the loss of thousands of dollars in crude oil and gas, and might have resulted in heavy destruction of property."

Thus does Mr. D. J. Moran, president, describe the service rendered by the Conoco II, a 6-place Travel Air monoplane, and Conoco III, a 3-place Challenger Robin.

During a promotion campaign, the Travel Air carried four company executives on a 5,000-mile tour, making 12 stops for sales meetings. On this one tour, it was estimated that use of the Travel Air represented a saving of $2,000 over any other means of transportation.

The 3-place Robin is assigned to Mr. O. M. Bounds, aviation sales manager, "not as a passenger ship, but to use just as the jobber salesman or dealer salesman uses his automobile." Not only has the Robin proved itself indispensable in covering a large sales territory, but its smart appearance has a decidedly advantageous effect in making aviation sales.

The Conoco planes are constantly used when emergencies demand quick action. They have carried experts from Oklahoma to California to cap a "wild" gas well. A break in a cross-country pipe line, from which gas escaped at a rate of $4,000 daily, was discovered from the air in exactly 14 minutes flying time.

The Travel Air 6-place cabin monoplane, powered with the 300 h. p. Wright Whirlwind engine, has a high speed of 135 m. p. h., and a cruising range of 430 miles. It is a handsome ship, built for business, roomy, comfortable, dependable, economical.

The Robin 4-place cabin monoplane with 185 h. p. Challenger engine, sister ship of the endurance record holder, the "St. Louis" Robin, attains a high speed of 118 miles an hour and has a cruising range of 525 miles. Smart, swift, modern to the minute, the Robin is the last word in comfort, combined with economy of upkeep and operation.

Curtiss-Wright will gladly furnish complete details on the Robin and Travel Air cabin monoplanes, their adaptability to particular needs, and actual cost figures of operation and maintenance. Address Dept. T. R.-73

Ray Shrader, Frank Moore, J. E. Moorhead, and B. E. Sibley, sales executives, starting out on a 5000-mile sales promotion tour in a Travel Air Cabin Monoplane (Conoco II)

Sales Division

CURTISS-WRIGHT CORPORATION

27 West 57th Street, New York

THE STRENGTH OF THE PLANE IS IN THE TUBING

In the famous *RYAN*
Aircraft
TUBING by SUMMERILL

Is the backbone of Strength that makes these remarkable planes record breakers. Summerill Seamless Steel Aircraft tubing is used extensively in all Ryan Aircraft

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MILLS: MILLBURY, MASS., MIDDLEVILLE, N. Y., JOHNSON CITY, N. Y., JACKSON, MICH.

A year from today . . .

you can be a BOEING-TRAINED Master Pilot or Master Mechanic

(CLASSES START JULY 9, 1930)

OF COURSE, you can learn to fly—or to work on airplane motors—in less time than the Boeing course requires. Probably for less money, too. In fact, for those unable to take maximum training, the Boeing School of Aeronautics offers shorter, less expensive courses—just as carefully planned, just as painstakingly taught, using the same complete equipment.

But the Boeing Master Pilot and Master Mechanic courses embody everything that can be taught—in theory and in practice—about the jobs to which they lead. Courses so broad, so fundamental, that only further experience can teach you more.

No wonder a Boeing diploma means more to employers. Moreover, this "University of the Air" is affiliated with the Boeing Airplane Co., the nation's largest airplane factory, and the two Boeing transport companies, operating the nation's two longest air mail-passenger routes.

Master Pilot and Master Mechanic courses start July 9. Enroll in other courses any time. Mail the coupon for full details.

BOEING
SCHOOL OF AERONAUTICS

Division of United Aircraft & Transport Corporation

BOEING SCHOOL OF AERONAUTICS AV-6730
Airport, Oakland, California

Gentlemen: I am interested in

☐ Private Pilot
☐ Transport Pilot
☐ Limited Commercial
☐ Master Mechanic
☐ Boeing Master Pilot
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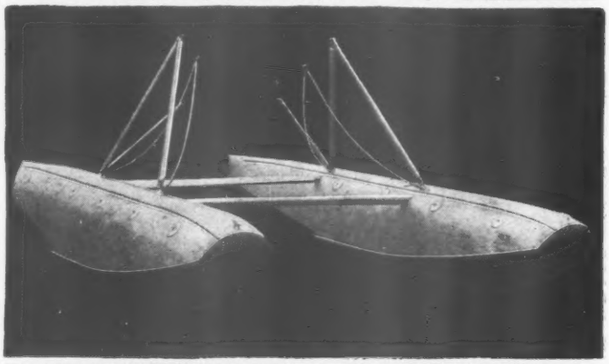
Pontoons



. . . That Have Established Remarkable Performance Records

A pair of pontoons, of the type illustrated above, designed and built by Aircraft Products Corporation for use on a Ford Tri-motor 5 AT, permitted this mammoth ship, with a gross weight of 13,500 lbs., to leave the water in 15 seconds. And in actual tests it was found that, due to the careful streamlining, these pontoons reduced the top speed of the ship only five miles per hour. Aircraft Products Corporation's pontoons have established a new standard of performance efficiency on many well-known airplanes. Individual plane owners who are in the market for pontoons, or manufacturers of aircraft who are anxious to recommend to purchasers of their airplanes, the lightest, most efficient pontoon yet produced, will investigate the superior performance of airplanes equipped with these pontoons. Our engineers will gladly give you performance data and prices on pontoons for your particular ship. Do not hesitate to call on them.

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Manufacturers of Airplane Wheels and Brakes, Axles and Complete Undercarriages, Oildraulic Shock Struts, Tail Wheel Assemblies, Glider Wheels, Pontoons, Flying Boat Hulls, Wing Tip Floats, Airplane Skids, Gasoline Tanks, Oil Tanks and Oil Coolers.

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28,000 FEET UP*

...in formation!

[This international record was made at Mather Field, April 12]

NONE but Boeing-built planes have been able to achieve this altitude in formation flight—a gruelling test that tells its own story of Boeing super-performance.

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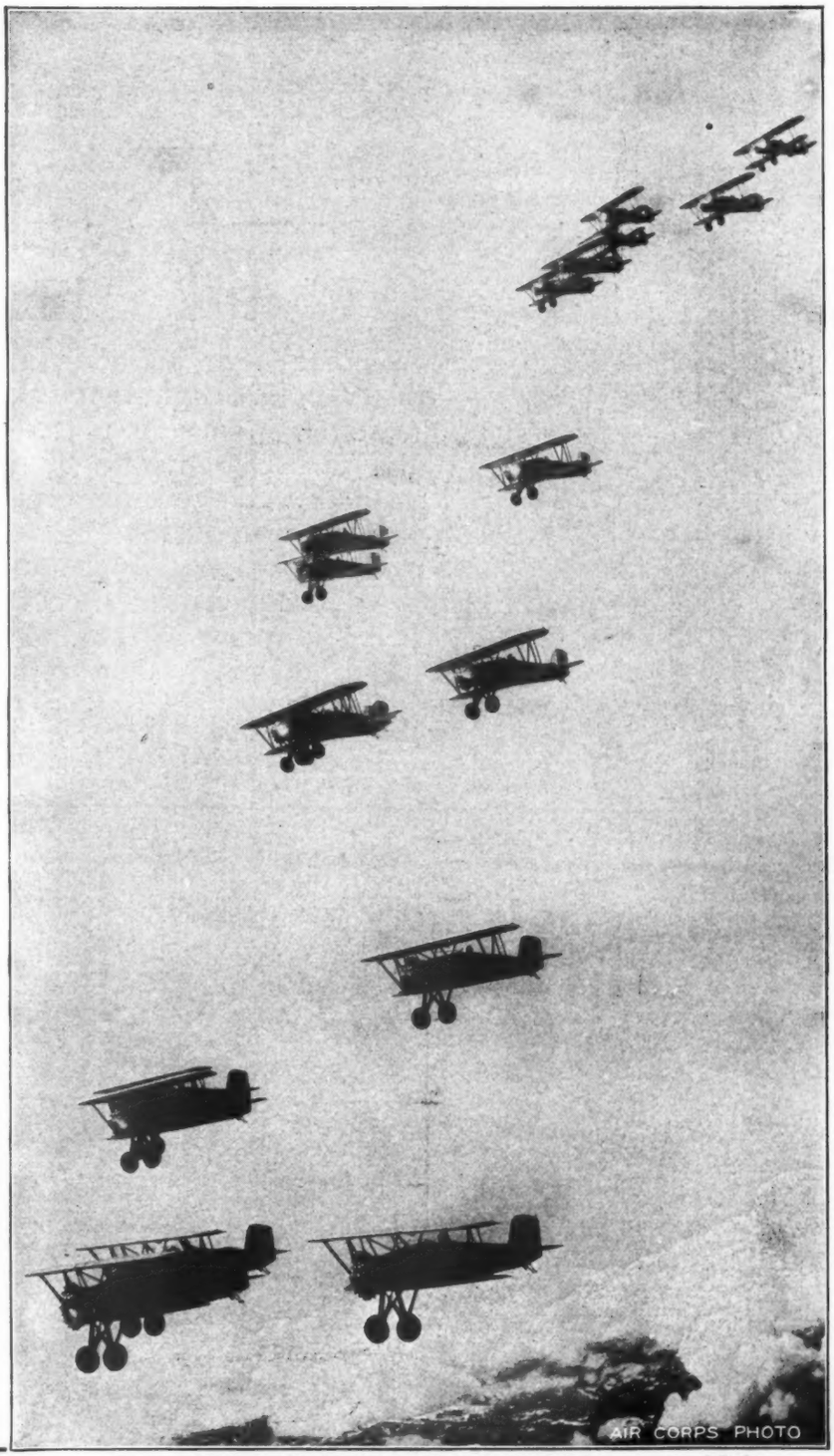
This same superiority of design, quality of material and performance, is found in all Boeing commercial planes



Air Corps Photo showing Wasp-powered Boeing P-12B fighters in record flight.

BOEING

AIRPLANE COMPANY

SEATTLE, WASH.

A Division of the United Aircraft and Transport Corporation.

(In Canada: Boeing Aircraft of Canada, Ltd., Vancouver, B. C.)

The Boeing Airplane Company offers the following models for immediate delivery:

MODEL 204—6-PLACE FLYING BOAT, 425 h. p. Wasp. High speed, 133 m. p. h. 15-second take-off, 913 pounds payload.

MODEL 80-A TRI-MOTOR TRANSPORT. Three 525 h. p. Hornets. High speed, 138 m. p. h. 11-second take-off, 3750 pounds payload. Many new features.

Delivery schedule on other models on request.

Note: All planes completely equipped. Bonded and shielded for radio. All performances guaranteed, not estimated.

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Every pound counts in Aviation

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LIGHT WEIGHT

in Leather is important

Colonial Grain Aviation Leather is one of the lightest upholstery materials. The reason is because it is top grain leather and manufactured by weight-saving methods. Colonial Grain Aviation Leather weighs less than 0.098 pounds per square foot. In addition it is fireproof, most comfortable, and attractive. It resists wear. A sample will show you its advantages.

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An airport is only as good as its hangars!

ACCESSIBLE location, open country, long, level runways,—all of them mean little if hangar equipment is inadequate.

With a Maryland Metal Hangar you're ready for any emergency—any call for accommodation or service.

Full opening doorways, unobstructed floor space, ample light and ventilation provide safe, easy handling of ships. Comfortable quarters, machine shop, lounging room and parts storage snugly and conveniently housed. Staunch—attractive—economical—built of rigid, interlocking sections of Lyonore Metal, the corrosion resisting alloy—Maryland Metal Airport Buildings are built for permanence.

Send today for your copy of "Airport Buildings and their Construction."

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announces an all-electric A. C. operated

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Airport Weather Receiver

Model AR 594C

105 to 125 Volt, 50 to 60 Cycle Alternating Current Operation

$125 (less Radiotrons and Loudspeaker)

UTILIZING the new screen-grid and power-amplifying Radiotrons for the reception of Department of Commerce Radio Broadcasts of weather and landing conditions.

Through the use of this receiver at the airport, pilots who are about to take off will be fully informed of weather and landing conditions along the route they propose to fly.

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Brand New OX5 Motors	$450
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Light Weight Flying Suits

Warmer weather means lighter weight flying clothes. And right here we have a well-made suit in either white or khaki herringbone; button front, ankle and wrist straps; belt, pockets, roomy, aviation emblem on left breast at, per suit **$4.00**

Sizes 46 to 50, 10% additional.

No. 2086 Lee Whizit suit in grey, marine or white herringbone; zipper front; strap ankle and wrists; convertible collar, per suit..... **$7.50**

No. 2094 White, No. 2092 Khaki herringbone flying suit; zipper front, ankle and wrists; large pockets, belted and roomy; a remarkable suit, at each **$9.00**

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SC90—Imported Cordovan cape, summer weight, unlined..**$4.50**

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Army No. 5—First quality chamois unlined; an ideal summer helmet, each **$4.00**

NB Commercial No. 6 — Well made Gaberdine cloth helmet, either tan or white, fits snug and cool for summer, each **$1.25**

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GOGGLES—In Catalog "H" on pages 87 to 94 a most complete line of goggles is listed and illustrated to make your selection an easy matter. Full stocks assure immediate shipment of orders.

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NB Special, white, complete with metal working parts.....**$6.00**
Orange Color **7.50**
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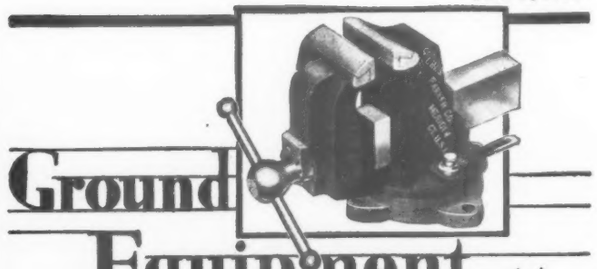
HARDNESS AND SIZE ARE CHECKED

TO MAKE precise parts that are *accurate* every detail must be carefully checked.

The illustration above shows the Rockwell Hardness Tester being used by a Govro-Nelson engineer to determine the hardness of a jig detail. The instrument in the background is a direct reading comparator — accurate to .0001 inch. It enables Govro-Nelson to check roundness with nearly perfect accuracy.

These machines are but a part of the splendid equipment used by Govro-Nelson in the manufacture of precision parts for the aircraft industry.

GOVRO NELSON COMPANY
1931 ANTOINETTE - DETROIT



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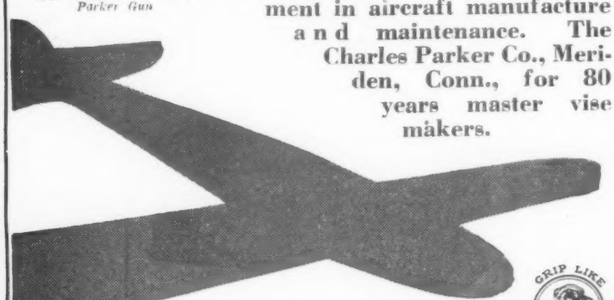
Makers of the Famous Parker Gun

Adaptability, sturdy construction, precision—these are qualities which recommend the Parker Airplane Vises as indispensable bench equipment in aircraft manufacture and maintenance. The Charles Parker Co., Meriden, Conn., for 80 years master vise makers.



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GRIP LIKE A GRIZZLY

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Business Wants

THE *Searchlight* Section of this paper represents a meeting place for men and concerns who have immediate business "wants" to fill—the section covers

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Agents Wanted
Books and Periodicals
Business Opportunities
Civil Service Opportunities
Contracts Wanted
Desk Room for Rent or Wanted
Educational
Employment Agencies
Employment Service
Foreign Business
For Exchange
For Rent
For Sale
Franchises
Labor Bureaus
Miscellaneous Wants
New Industries Wanted
Office Space for Rent or Wanted
Partners Wanted
Patent Attorneys
Patents for Sale
Plants for Sale
Positions Vacant
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Representatives Wanted
Salesmen Available
Salesmen Wanted
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Sub-Contracts Wanted
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Work Wanted

"SEARCHLIGHT"

Where the factor of safety is all important . . . .

Through Death Valley, across the Bad Lands, the Rockies, or scorching desert sands, the reliability of Zapon products continues supreme. Since the beginning of aviation they have contributed largely as an all important factor of safety. In

Clear Nitrate Aeroplane Dopes
Semi Pigmented Aeroplane Dopes
Gloss Pigmented Aeroplane Dopes

the element of safety is constantly assured by the most exacting series of continuous laboratory tests, each step vitally essential to maintaining not only the highest standard of Zapon quality but also absolute safety in the air.

Also Thinners, Lacquer Enamels and Lacquer Primers

It is the age of color even for the plane and in keeping with this modern desire, Zapon Cloth for interior upholstery lends an ultra luxurious finish to the finest sport job. Brilliant in color, attractive in pattern, its durability is such as to "wear and wear and wear."

THE ZAPON COMPANY
STAMFORD, CONN.

Is Your Instrument Panel "WESTONIZED" *for* Accurate Engine Speeds?

INSTANTLY, smoothly and with absolute accuracy engine speeds are now shown on an indicator located directly in front of the pilot. He has but to glance at the instrument panel before him to be assured that his motors are functioning properly, or else to be warned in time when trouble is imminent. For Weston now provides the means of obtaining aircraft engine speeds with *electrical certainty*—infinitely more dependable than mechanical methods. Moreover, only in this system of measurement is it possible to transmit speed indications *for all types of planes* to a point of convenient reading along with other instruments of aircraft control.

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We invite manufacturers of aircraft to investigate this method of speed measurement. Now installed on many mail and passenger planes. Can be adapted quickly to any type of engine. Write to factory direct or to our nearest representatives.

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Don't Peel
Don't Rot

Good Take Up
Good Fill
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Other models from
60 H.P.—600 H.P.

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Detroit, Michigan

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The New

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Cabin Monoplane

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Locks in any position

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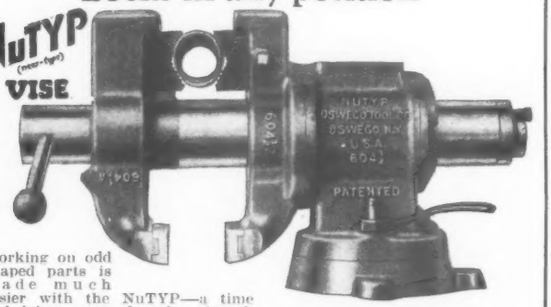

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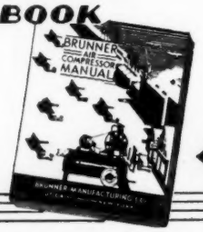

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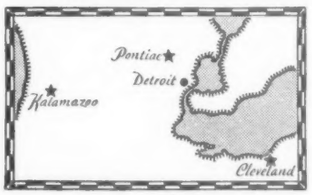

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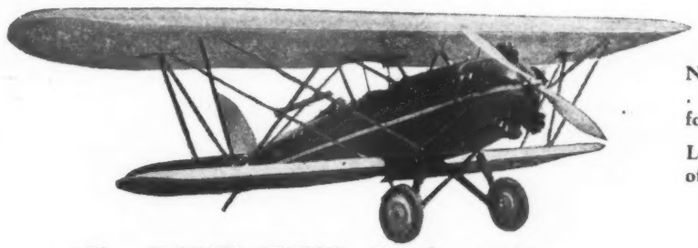

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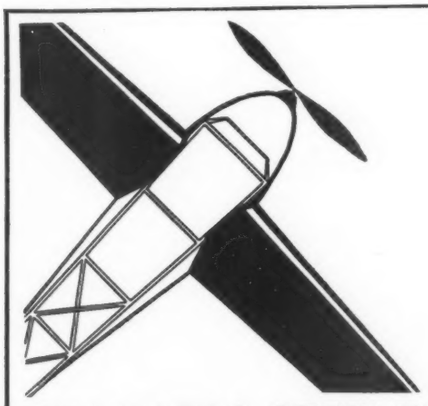

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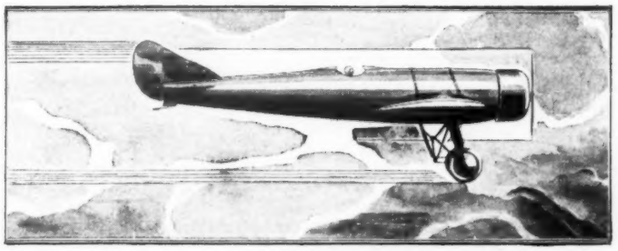

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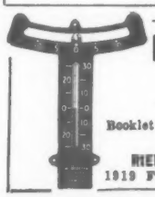
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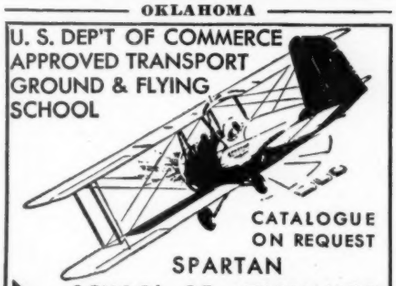

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AERONAUTICAL engineer wanted, competent on stress analysis. Some experience on all metal production preferred. State experience and salary expected. P-554, Aviation, 520 No. Michigan Ave., Chicago, Ill.

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WANTED—pilot with good ship to take over a good flying proposition. Write or wire. R. L. Jackson, 202 E. Pike Street, Clarksburg, W. Va.

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RESEARCH engineer, associated with testing laboratory at a leading eastern university, has part time available for commercial research and development work. PW-557, Aviation, Tenth Ave. at 36th St., New York.

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I WANT to meet one or more parties who can furnish capital for building fastest line of transport airplanes in U. S. Can make excellent proposition. BO-555, Aviation, 520 No. Michigan Ave., Chicago, Ill.

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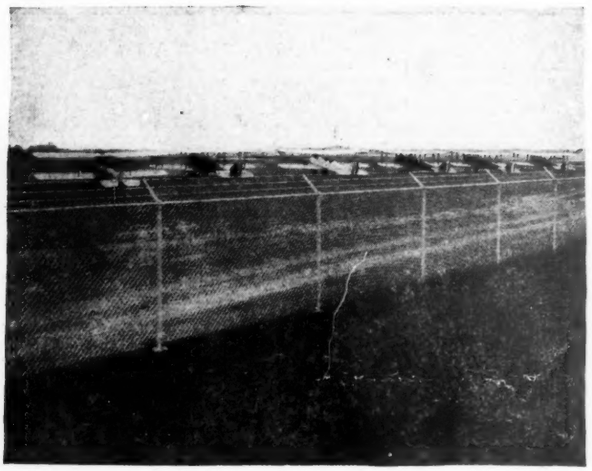

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The 5th Annual Air Tour last year proved that fencing is absolutely essential to the handling of crowds at airports. Many troubles were experienced at open airports. A magazine editor reporting the tour said "Crowds invaded the fields as soon as planes had landed. They milled heedlessly about while engines were being warmed up and the absence of fatalities can be accredited only to providential intervention."

But where airports are fenced, crowds are always out of danger, adding to the safety of both fliers and spectators.

Many leading airports have already installed Cyclone Fence. It is an invitation to air tours to visit their cities. It helps them become terminals for air lines. Interest in aviation is stimulated by absence of casualties.

Cyclone Fence is made of durable copper-steel and lasts for years in any climate. Special wide gates for airports. Erected on H-Column line posts for maximum strength. Installed by our own trained crews. Service everywhere.

Write for information.
No obligation.

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Subsidiary of
UNITED STATES STEEL CORPORATION
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Cyclone Fence REG. U.S. PAT. OFF.

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WHERE TO FLY

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LINDBERGH

for his Coast to Coast Record
depended upon a

PRATT & WHITNEY
"WASP" Engine
equipped with

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SCINTILLA MAGNETO CO., INC.
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Pratt & Whitney Wasp
used on
The Lockheed Sirius

DEPENDABILITY
SIMPLICITY
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PILOT RADIO SOUTH AMERICAN
GOOD WILL FLIGHT
RADIOGRAM
APRIL 2, 1930
VIA N. Y. TIMES—10 MINUTES AFTER TAKING OFF FROM OPEN OCEAN
NEW YORK TIMES
NEW YORK NY
PLEASE TELL EDO THEIR FLOATS SURE SHOWED WHAT WAS IN THEM LAST NIGHT
YANCEY
ALEXANDER
BOUCK

EDO FLOATS

NIGHT in the Gulf Stream... a sturdy seaplane heaves and lurches with the changing, surging swells... dark waters charge and swirl across the EDO Floats that shoulder the cabin high above the reaching waves... each man, in turn, stands watch as his two companions sleep... an ocean liner draws close, but aid is declined... dawn and a rising sea... a takeoff through the foam... then a radio message flashes across the 700 miles to New York: "Please tell EDO their floats sure showed what was in them last night."

This was a thrilling part of the epic flight—the first time a plane had ever flown from New York to Bermuda—the first plane ever to land in open ocean on a long flight and again resume the air after a night spent at sea.

The "Pilot Radio," a Stinson cabin monoplane, Wright Whirlwind-powered and equipped with standard EDO Floats, took off heavily loaded from Long Island Sound at 9:37 A. M., April 1st, and laid its nose on a bee-line for Bermuda. Capt. Lewis Yancey, navigator and veteran of one trans-Atlantic flight was in charge. Wm. Alexander, master pilot, had the controls, and Zeh Bouck, radio expert, handled all communications. Messages of progress were continually broadcast. But due to an unavoidable delay at the start, their goal was not sighted by evening. Rather than risk a landing in an unlighted harbor, it was decided to trust in EDO Floats and ride the sea for the night. No wind retarded the ship and the floats took the full 55-mile landing impact on the 15-foot wave crests.

The sea was rougher at dawn, but with EDO Floats and skilled handling, the ship rose swiftly and surely. In less than an hour the tiny spot of land to which Capt. Yancey had laid a straight course, came rolling over the horizon, and with it calm, sheltered water—and triumph!

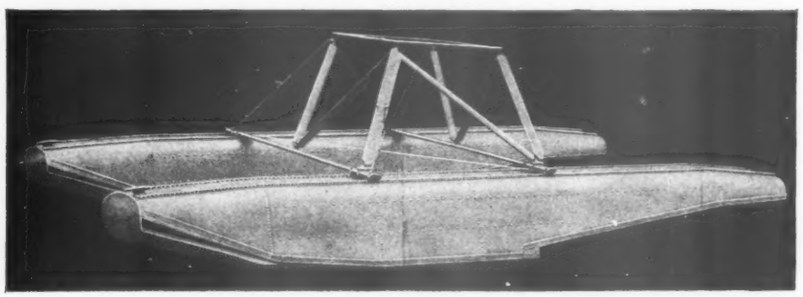
As long as the ocean rolls, honest handiwork will merit reliance. Three men put their trust in EDO Floats and found them not wanting. For EDO Floats, from struts to fluted bottoms, came through the test 100% perfect!

EDO Floats are manufactured in 11 models for the conversion of more than 40 distinct types of land planes up to 8250 lbs. gross weight. They are approved by the U. S. Department of Commerce, and recognized everywhere as the standard of commercial airplanes.

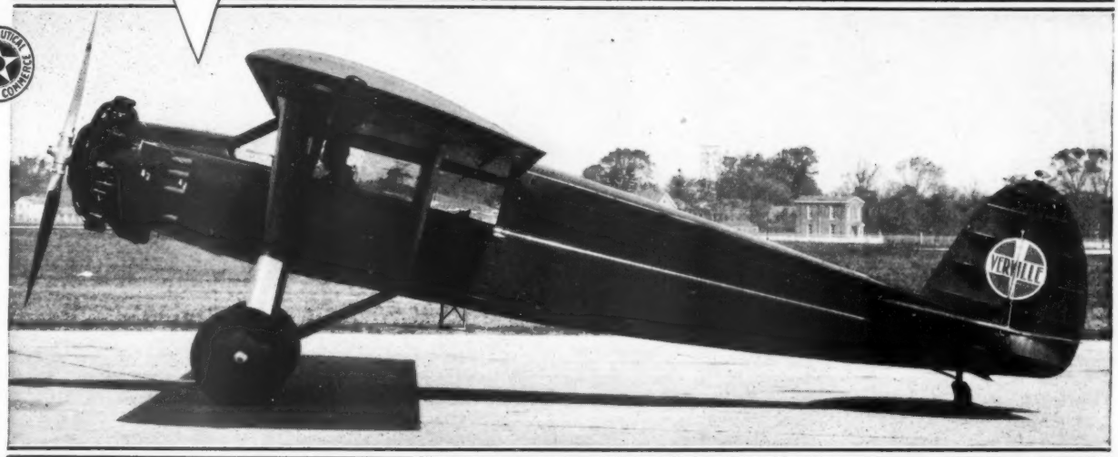
Airplane manufacturers, transport operators and private owners who have not availed themselves of the services of the experienced staff of EDO engineering specialists, are cordially invited to do so. Address, Edo Aircraft Corporation, 600 Second Street, College Point, L. I.

FEATURES TO REMEMBER ABOUT EDO FLOATS

All metal construction.
Protected from corrosion.
Will not swell, shrink or absorb water.
Bulkheaded each 2 feet for protection.
Patented fluted bottoms for quick takeoff.
Heavy keels, shallow sterns for beaching.
Flat decks for ease of taking on loads.
Interchangeable with wheel landing gear.
Easy to install and overhaul.



Verville



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THE VERVILLE AIRCRAFT COMPANY
GREEN AND MELVILLE AVENUES
DETROIT

March 8, 1930

Sky Specialties Corporation,
3651 Hart Avenue,
Detroit, Michigan.

Attention: F. B. Stover

Dear Mr. Stover:

We are enclosing a photograph of the 1930 Model Verville Air Coach which Mr. Walter Anderson has purchased to use in connection with his business.

We believe that automatic starters are no longer a luxury. Because of its universally acknowledged merit we have selected the Heywood Starter for installation on Mr. Anderson's Coach.

We wish to thank you for the cooperation you have given us, and congratulate you on the excellence of your product.

Very truly yours,

THE VERVILLE AIRCRAFT COMPANY

E. A. Goff, Jr.,
Director of Sales.

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Following the practice of building their product according to the last word in aeronautical refinement, Verville have equipped this beautiful Limousine of the Air with the Heywood Starter.

In keeping with the luxury of the Verville design the Heywood Starter adds the convenience and comfort of starting from the cabin seat.

And Heywood's never-failing start, its instantaneous response to a pull on the starter trigger, its sure performance in all kinds of weather—all of these qualities serve to add to the performance for which Verville is justly famous.

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Start-er by Heywood

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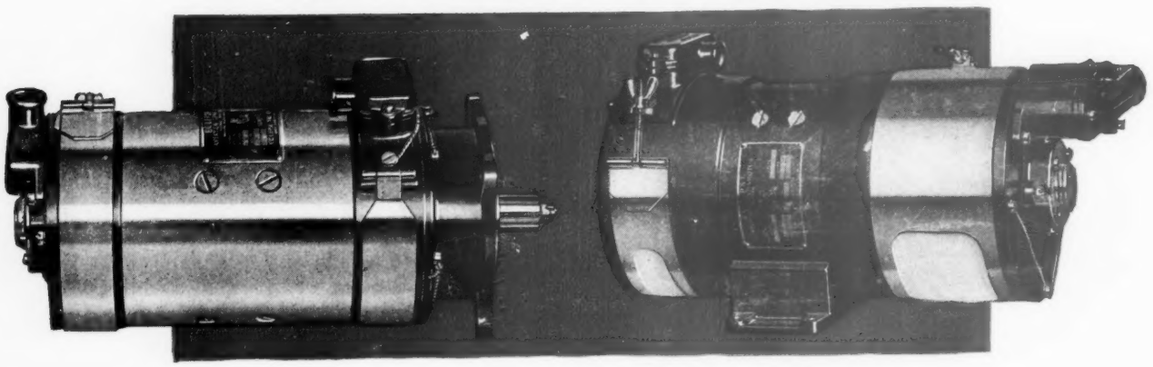

ECLIPSE

DOUBLE VOLTAGE VOLTAGE-REGULATED RADIO GENERATOR ENGINE DRIVEN TYPE

The constantly increasing use of Aircraft Radio and the necessity for battery installations to take care of accessories such as navigation lights, landing lights, electric starters, etc., has necessitated development of a means whereby the current required for operation of all this equipment may be produced by a single unit. Eclipse Double Voltage Generators have been especially designed and developed to meet this aircraft requirement.

AVIATION DYNAMOTOR

The Dynamotor is especially recommended as a power supply for long range aircraft transmitting sets. Designed for use in conjunction with the Eclipse 50 Ampere 15 Volt Engine Driven Generator, the Dynamotor provides power for radio operation in the air—or for a limited time on the ground—a highly desirable feature in the event of a forced landing.

Write for further particulars

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East Orange, New Jersey

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